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THE IRON AGE

Published every Thursday Morning by David Williams Co., 14-16 Park Place, New York.

Vol. 84: No. 20. *New York, Thursday, November 11, 1909.* $5.00 a Year, including Postage. Single Copies, 10 Cents.

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See page 55

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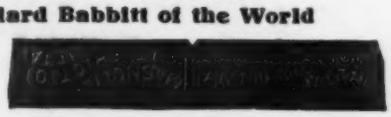

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THE IRON AGE

New York, Thursday, November 11, 1909.

The Oxhydric Process of Cutting and Welding Metals.

Its Use Following the Pabst Boiler Explosion.

The new oxhydric process of cutting and welding had a rather dramatic introduction to the metal users of this country, in connection with a disaster at Milwaukee, Wis., where its usefulness was proved in the first public test to be made, anticipating by a week a series of demonstrations which were to have been conducted in the steel foundry of the Falk Company, Milwaukee.

The Boiler Explosion.

On the morning of October 26 four boilers in the power house of the Pabst Brewing Company burst, causing the death of one man and the serious injury of a second, together with a property loss estimated at about $200,000. The accompanying illustrations show something of the extent of the damage. The explosion demolished the boiler house, threw one boiler section to the roof of an adjoining building, and moved a six-story steel frame grain elevator, which stood next to the boiler house, 4 ft. sideways on its base.

A Part of One of the Pabst Brewery Company's Boilers Thrown to the Top of a Building on the Opposite Side of the Street.

The wrecked boiler house was 49½ ft. wide and 161 ft. long, and was only a few years old. It was of brick construction. The building contained eight boilers arranged along the south side of the building. They were divided into two sections of four each, with a brick stack between them. Two Edge Moor boilers had only recently been set in place and were not yet in service. The other six were Munoz boilers. As near as can be determined four of these boilers at the east end of the boiler house exploded. Whether they all exploded at the same instant or whether the wrecking of one so weakened the others that they also burst is hard to determine. However, the latter is probably the case, as it seems the men had some sort of warning before the wreckage was complete and some succeeded in getting out doors.

The boilers were of the water tube type. The main bank of tubes was fastened to the usual serpentine header, which in turn connected to a cast steel yoke or header between the two steam drums. These drums were 36 in. in diameter, and the steel was ⅜in. thick. At each side of the furnace was a row of vertical tubes running from a mud drum to the steam drums. Where these tubes entered the drum the latter was reinforced by a sheet of steel extending the entire length of the drum. This sheet was fastened by a single row of rivets at each side. The rivet holes had a pitch of 2⅞ in. and were 13-16 in. diameter. An examination of the exploded boilers seems to indicate that they all failed in the same place, which was lengthwise of the drums, through the rivet holes on each side of the plates mentioned. In most cases this plate was found still fastened to the vertical tubes and mud drums. The remainder of the steam drums and the banks of tubes were a tangled mass of wreckage spread, for the most part, about the wreckage of the boiler room.

At 11 on the morning after the explosion, a hurry call

was received at the plant of the Falk Company asking that the oxhydric apparatus, being developed by this company, and operators, be sent to the Pabst plant to assist in clearing away the wreckage of tangled metal. Only four men in this country have yet had experience in handling the oxhydric process. These are Primo Lulli of Genoa, who invented the process; Hans Mueller, a Belgian, who perfected the apparatus, and two Americans connected with the Falk Company, who have mastered its use. Ten minutes after the call came these four men were rushed in an automobile with their apparatus to the Pabst works. There, under the personal superintendence of Herman Falk, they began cutting through steel girders, metal sheets and great banks of iron to clear the plant in the shortest possible time. For nearly 25 hours these men continued their work, until Lulli was injured by a falling beam. After a short rest during the day the other three men continued the work through the night. Hans Mueller had his foot crushed by a sliding mass of metal and was compelled to drop out. The two remaining operators, Americans, continued to clear away the wreckage until it was possible to clean everything out and start the repair work.

The Elevator Building at the Left, a Steel Frame Structure, Was Moved 4 Ft. on Its Foundations.

One of the most unique pieces of work done at the Pabst plant was in the cutting of a large square hole in the bottom of an overturned coal bunker. In falling this bunker with the coal it contained had turned turtle, and lay bottom side up so that it was impossible to get at the coal. No machinery at hand was capable of lifting the bunker, so the expedient of cutting through the upturned bottom was resorted to. In a few minutes a hole 3 ft. square was cut and made possible the removal of the coal.

Other Tests of the Apparatus.

Before this application of the oxhydric apparatus to commercial work it had been thoroughly tried out in shop tests. One of the most striking of these was the cutting of a piece of 9-in. chrome-nickel steel to a circular outline. This was done at a speed of a linear foot of cut in 2¼ minutes. The apparatus has also proved useful in cutting thinner pieces, or patterns requiring an irregular outline, as will be mentioned later.

The Apparatus.

The apparatus used in obtaining such remarkable results is an adaptation and improvement of one patented in 1901 by the Cologne Meusen Mining Company for opening plugged blast furnace tap holes, and which is quite extensively used in this country. This original device has cut holes through more than 4 ft. of solid metal in about 4 per cent. of the time formerly required. Both the original and the new apparatus use two nozzles, one of which supplies a mixture of oxygen and hydrogen, while the other furnishes pure oxygen. The effect of the original device is to melt the metal, and for such purposes is entirely satisfactory, but it cannot produce a smooth, accurate cut of any length. With the improved apparatus one nozzle, delivering mixed oxygen and hydrogen, is used for preheating the metal to the required temperature. A second nozzle, fastened to the first in such a way that it always follows the first, and set so that the streams of gas from both nozzles strike the metal in the same place, delivers only pure oxygen.

The oxhydric process is based on the chemical attraction which exists between iron and oxygen, whereby iron in an atmosphere of oxygen burns freely and rapidly. The action is particularly pronounced if the iron has been heated before coming in contact with the oxygen. With the apparatus described the preheater raises the iron to a temperature of from 1300 to 1500 degrees F., which is the temperature at which the oxygen acts most freely on the iron and produces different forms of oxides. The whole action is to cut the metal by oxidizing it without melting it, and the oxides formed are blown away by the force of the blast. The resulting cut is similar to that which might be made by a cutting tool. The effect of the heating is only local and does not penetrate more that 1-64 in. into the surface of the cut, the width of which is no greater than a saw cut.

The new double nozzle torch can be used on thick or thin plates, twisted sheets, structural shapes, castings, tubes, and, in short, on any piece where the flame can be applied. It may be controlled by hand or in a mechanical device especially designed for the work. Lines of any sort can be followed, the circular or irregular curve being worked as successfully as the straight line. Beveled or perpendicular cuts can be made with equal ease, and the width of the cut is practically uniform from top to bottom. Harveyized high manganese or nickel chrome steel, tempered, or hardened, forged, cast, or rolled steels can all be cut.

The complete apparatus for cutting consists of two steel bottles which contain the oxygen and hydrogen, the pressure gauges which go with them, the mixing chamber, the nozzles, and the armored tubing carrying the gas. The pressure maintained in the bottles varies from 1500 to 2000 lb. per square inch. The gas leaves the bottle through a needle valve, which admits it to a pressure regulating valve that constantly maintains an even flow and pressure from the bottles through the mixer to the

nozzles. A low pressure gauge on the regulating valve serves to guide in the setting of the valve for various kinds of work, while a high pressure gauge on the bottle can be used in determining the amount of gas used. Heavily armored rubber tubes convey the gas to the mixing chamber, which is separate from the rest of the apparatus and water cooled to safeguard against explosion. Worm shaped conical pipes in the mixer combine the two gases thoroughly before they leave. More heavily armored rubber tubing conveys the gas to the nozzles already mentioned.

Gas Consumption.

This apparatus has been in use abroad long enough now so that quite accurate figures are obtainable as to the amount of gas, size of nozzle, &c., necessary. Table I gives figures of the cubic feet of gas used in cutting slabs of various thickness of metal from 1⅛ to 6½ in. On 4-in. metal the cut was ⅛ in. wide, while on thinner metal it was only 5-64 in. The surfaces are as smooth as a saw would leave them. Table II gives a somewhat closer graduation of gas consumed.

Table I.

Number of piece counting from the left.	Thickness of metal in inches.	Consumption of gas for each lineal foot of metal cut. Oxygen.	Hydrogen.
1	1⅛	3.9	3.9
2	2	4.8	4.8
3	2⅝	8.3	5.8
4	4	14.4	7.7
5	4⅝	15.5	8.8
6	4¾	17.5	9.0
7	6½	22.3	10.3

Table I.—Gases used in cutting slabs shown in Fig. 5.

Table II.

Thickness of metal, inches.	Size of nozzle for cutting or oxygen torch, inches.	Size of nozzle for heating or oxhydric torch, inches.	Cubic feet of gas used for each lineal foot of metal cut. Oxygen.	Hydrogen.
0.2	0.06	0.12	1.5	1.5
0.4	0.06	0.12	1.9	1.9
0.6	0.06	0.12	2.2	2.2
0.8	0.06	0.12	2.5	2.5
1.0	0.08	0.16	2.9	2.8
1.2	0.08	0.16	3.3	3.2
1.4	0.08	0.16	3.8	3.4
1.6	0.08	0.16	4.4	3.6
1.8	0.08	0.16	5.1	3.8
2.0	0.08	0.16	5.8	3.9
2.2	0.08	0.16	6.5	4.1
2.4	0.08	0.16	7.2	4.3
2.6	0.08	0.16	8.0	4.6
2.8	0.08	0.16	8.8	4.8
3.0	0.08	0.16	9.7	5.0
3.2	0.08	0.16	10.7	5.3
3.4	0.08	0.16	11.8	5.6
3.6	0.08	0.16	12.8	6.0
3.8	0.08	0.16	13.9	6.4
4.0	0.08	0.16	15.0	6.9
4.2	0.08	0.16	16.2	7.4
4.4	0.08	0.16	17.5	8.0
4.6	0.08	0.16	18.8	8.5
4.8	0.08	0.16	20.2	9.0
5.0	0.08	0.16	22.7	9.5

Table II.—Amount of gas and size of torch used while cutting steel from 1-10 to 5 in. thick.

Adaptations.

Different appliances have been designed for cutting various shapes. One is arranged so that the torch can be moved in two directions at right angles to each other. With this device strips of steel ⅛ in. wide have been cut. Other appliances are furnished for cutting circular and irregular shapes. These are all so arranged that the preheating nozzle precedes the oxygen nozzle. In the cutting of steel tubes this method has proved extremely successful. A special attachment is made which holds the tube firmly in the center and provides means for rotating the torch outside. This can be used on either plain or flanged tubes. Table III gives the gas consumption for cutting different diameters of pipe. The oxhydric flame can be used also in cutting manholes and irregular openings wherever needed and much quicker than by other methods. Rivets are easily taken off and the apparatus proves itself useful in many ways in the machine and boiler shop. In the cutting up of junk to sizes suitable for charging it has proved very effective. In one case an old armored cruiser was dismantled and cut into scrap in two and one-half months, where similar jobs before had taken a year and a half. In the foundry it is useful in removing sprues, risers, &c., which it cuts off cleanly and regularly.

Table III.

Thickness of metal.	Outside diameter of tubes in inches.																		
3-32 to ⅛	2	2⅜	2¾	3¼	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
⅛ to 3-16	..	..	..	..	3¾	4¼	4¾	5¼	5¾	6¼	6¾	..	..	..	..	..	..	..	..
3-16 to 5-16	..	..	..	..	..	..	..	..	..	..	..	7¼	7¾	8¼	8¾	9½	10	10¾	12
	Cubic feet of gas consumed.																		
Oxygen	2.3	2.6	3.2	4.5	5.2	5.9	6.6	7.4	8.1	8.8	9.5	14.4	15.3	16.3	17.3	18.0	19.0	21.5	24.0
Hydrogen	7.4	8.7	10.4	13.0	18.0	20.5	23.0	25.5	28.0	30.5	33.0	50.0	53.5	57.0	60.5	66.0	70.0	75.0	83.0

Table III.—Amount of gas used for cutting and welding tubes from 2 to 12 in. in diameter.

Oxhydric Welding.

It has been found that the oxhydric process is applicable to the art of welding as well as in the cutting of metals. However, for welding a single nozzle is used which burns only the mixed hydrogen and oxygen gases. This flame reduces rather than induces oxidation, which latter is undesirable in welding. Except for the single nozzle and the single hose from the mixer, the apparatus used is the same as that described previously.

This method of welding does not affect the ductility of the metal. A light hammering of the joint, while the metal is cooling, or applying a heat treatment after the metal is cooled, will generally make the joint nearly as strong as the original metal. In the older fusion method of welding thick plates they are quite commonly made with the joints in the form of a V. This is then filled by melting metal from a rod. If the metal is properly fused a good joint results, but if drops of hot metal are

After the Explosion Preparing to Cut Away the Intertwisted Iron Work with the Oxhydric Process.

allowed to fall on a joint not properly heated, the two will not fuse and the joint will be imperfect.

With the oxhydric process applied to sheets from ⅜ to 1 in. thick, the two pieces to be welded are placed with their ends in contact, but not lapping. Two oxhydric torches are used, one on each side of the metal, and exactly opposite. The flame contact is made as broad as possible. By the time the surface metal begins to show signs of melting it is probable that the interior of the pieces are at a white welding heat. At this point the torches are removed and the joint lightly hammered on an anvil, which completes the weld by a rearrangement of the molecular structure.

When this process of welding was first conceived there was a difficulty which was hard to get around. The welding gas should consist of one part of oxygen to four or six parts of hydrogen, and it is important that all the oxygen be absorbed in order to produce a flame of uniform character. A gas with these proportions is very explosive, and at first there was fear from this source. The difficulty was surmounted by causing the gas to travel at a speed greater than that of flame propagation. The velocity of flame propagation depends on the kind of gas and increases as the square of the tube section. This being the case, an explosive gas will not ignite in its containing tube if given a velocity greater than that of flame propagation, and this was done in the present case. Having thus determined the minimum velocity, the maximum velocity was determined from the practical consideration that the jet of gas must not be strong enough to disturb the drops of molten metal which constitute the weld. The torch used in the welding process has an enlarged chamber, which the gas first enters, which materially reduces its velocity. From this it passes through a conical tube having a smooth interior, and which has a bore gradually decreasing in size until the nozzle is reached. The dimensions of this tube and nozzle are so proportioned that the gases attain the desired minimum velocity on leaving.

The American Oxhydric Company, Milwaukee, Wis., has developed the methods described, and manufactures the various devices necessary for its use. It also manufactures commercially the oxygen and hydrogen, and supplies it in the metal bottles mentioned. The cost of this method of cutting and welding is claimed to be no greater than by other methods. No machinery is necessary, and the portability of the apparatus makes its use extremely flexible.

The Philadelphia Foundrymen's Association

The regular monthly meeting of the Philadelphia Foundrymen's Association was held at the Manufacturers' Club, in that city, on the evening of November 3, President Thomas Devlin occupying the chair. Routine business being transacted, A. G. Rodgers of the Carborundum Company, Niagara Falls, N. Y., was introduced and presented a paper on "Carborundum and Carborundum Products Used in the Foundry." Considerable discussion followed the reading of the paper, particular as to the use of carborundum fire sand for special molding work in foundry practice. Its use as a lining for brass furnaces was also favorably commented on. A vote of thanks was tendered Mr. Rodgers for his excellent paper.

Walter Wood, chairman of the Pig Iron Specification Committee, followed with a few remarks referring to the discussion of pig iron, as well as other specifications at the congress of the International Society for Testing Materials, held in Copenhagen, Denmark, in September. At the conference of the specification committees from the different societies, he said, that from America was the only one which had seriously taken up the question of pig iron specifications, although those in connection with the various steel products—car wheels, cast iron pipe and test bars for foundry castings, &c.—were generally considered, the English society confining itself more particularly to steel specifications. Owing to the fact that the other national societies had not considered these matters fully, the matter has been referred to the International Committee on Specifications, which will gather further data regarding pig iron, cast iron pipe and test bars with a view of arriving at the best method for the unification of those specifications. The subject has been brought to the attention of the Iron and Steel Institute, as indicated in the following copy of a letter written by Mr. Wood to Sir Hugh Bell, president of the institute:

As promised, I hand you herewith the action of the congress of the International Society for Testing Materials:

Resolution as to Pig Iron, adopted September 8. — For the purpose of defining more accurately the quality of pig iron than is possible by the present method of grading by fracture, the Congress recommends that Sub-Committee 1A be instructed to inquire in the various countries concerned as to how far specifications by analysis may be usefully substituted for the present method of grading by fracture, and that they may be authorized to take such steps as they may deem advisable to give effect to this resolution.

The committee consists of Baurath A. Rieppel, Nurnberg Machine Works, chairman; Prof. R. Stribeck, Krupps; Director H. Vehling, Roth-Erde; F. E. Robertson, London; F. W. Harbord, London; W. R. Webster, Philadelphia; Walter Wood, Philadelphia.

The situation at present is that the Foundrymen's National Association of America has adopted specifications for buying as per inclosed copy. The furnace operators in Germany are willing, when requested, to furnish metal with a guarantee (by analysis) as to its quality.

As to how far the proposed scheme is incorrect in principle or in its details is a subject for discussion. If there are changes to be brought forward the committee is desirous of receiving and duly and carefully considering them. While immediate action is not contemplated, it is but proper that they receive such without too prolonged delay.

The plan suggested contains provision for a wider "warehousing" of iron than has been possible heretofore, and also arranges for a definite basis of market quotations, which will be similar in all countries, as well as adjustments of errors in delivery of (or difficulties of a furnace producing) metal in accordance with contracts. It is not expected, because a basis is reached for international trading, that the local customs in any country should (unless it seem desirable) be discontinued for home use.

Resolution of Sub-Committee 1A as to specifications for cast iron pipe.—That in view of the close approximation of existing specifications for cast iron pipe in the various countries interested, the Sub-Committee 1A be instructed to submit to the associations in the respective countries copies of the specifications for cast iron pipe that have been placed before the Congress with their suggestions as to how unification can best be obtained.

Action of Sub-Committee 1A as to test bars. — In view of the general acceptance in principle of a separately cast "arbitration bar" to ascertain the quality of the metal going into iron castings, and the further acceptance of a bar of round section cast on end in dry sand, there remains only to determine the length of bar best calculated to give the most satisfactory technical and commercial results. It is therefore recommended that each country interested make a series of tests with bars approximating 1¼ in. in diameter and cast under standard conditions, the length varying from 6 to 24 in. between supports, from which this information can be obtained. A set of 10 bars each for three classes of ordinary gray iron 1.50, 2 and 2.50 per cent. silicon is suggested, enough bars being cast 26 in. long and cut up for test purposes. The analyses and records of tests are to be sent to Committee 1A for its information.

German ironmasters have to a considerable extent, Mr. Wood said, shown a willingness to furnish iron according to specification by analysis; the English ironmasters, however, move slowly in that respect, owing largely to the long-established customs which they have followed in the sale of good merchantable brands of pig iron and the warehousing of certain grades. Mr. Wood stated, however, that he did not believe that the difficulties in the adoption of a satisfactory basis for specifications were as serious as might generally be considered, as the buyers of pig iron are becoming more and more determined to buy their iron "on a basis of what it contained rather than what it looked like."

A general discussion of the foundry situation in this district followed, reports from various members indicating that the conditions in the trade are better; while all the plants are not fully engaged the volume of business is increasing and there is a strong tendency toward a higher price level. Adjournment followed, after which the usual luncheon was served in the dining room of the club.

The La Follette Iron Company, of which F. P. Howe of the Cranberry Furnace Company, Johnson City, Tenn., is president and M. H. Maury manager, has leased the blast furnace of the La Follette Coal, Iron & Railway Company, La Follette, Tenn. Improvements are being made and the furnace will be put in blast early next year.

Census Preparations.

Schedules of Manufacturers for the Thirteenth Census.

WASHINGTON, D. C., November 9, 1909.—Census Director Durand has approved the final draft of the general schedule of inquiries which will be used in the collection of statistics for the thirteenth census of manufactures, covering the calendar year 1909. The schedule is in the form of a four-page folder, a little larger than letter size. It is less complicated than the schedule upon which the 1900 and 1905 censuses of manufactures were taken, while the general scope is the same less than half as many entries are required. The schedule was prepared by the director, the assistant director and the chief statistician for manufactures, with the advice of the economic and statistical experts constituting the so-called Advisory Board of special agents.

The general schedule of manufactures will be distributed immediately after January 1 next by the special agents, of whom about 1600 will be appointed. There will be two classes of these employees; one called "chief special agents" and the other "assistant special agents." The chief special agents will each be placed in charge of a given territory or district of a State and the assistant special agents will be assigned to assist them.

Information to Be Confidential.

Director Durand has drafted a brief statement, which will be printed on each schedule, setting forth the authority under which the census is taken and guaranteeing manufacturers against the disclosure of information which they may furnish. In this connection, he says:

> All answers will be held absolutely confidential. No publication will be made in the census reports disclosing the name or operations of individual establishments in any particular. The act of Congress provides that the Bureau of the Census shall not permit any other than the sworn employees of the bureau to examine the individual reports. It also provides that any employee who shall, without the authority of the director of the census, publish or communicate any information coming into his possession, shall be guilty of a misdemeanor and upon conviction be fined not to exceed $1000, or to be imprisoned not to exceed two years, or both, in the discretion of the court.

Before adoption by the director, the schedule was submitted to well-known business men, representing boards of trade, chambers of commerce, manufacturers' associations, and also to individual authorities in the large manufacturing cities. The schedule has met with quite general approval of those to whom submitted.

The director was authorized by Congress to determine the form and subdivision of inquiries necessary to secure the information required for statistical purposes. Throughout the preparation of the schedule simplicity of inquiry has been sought, with the necessary completeness which will permit correct interpretation. Advantage has been taken of the experience of the bureau at the census of 1900, and it is believed that the application of the blank will result in a complete and satisfactory census.

There are in the new general schedule 13 principal questions, with their subdivisions. This is the same number as in the general schedule for 1905. There are, however, important differences between the two schedules. These comprise, in the 1909 schedule, the new questions authorized by Congress, the elimination of former queries to which it is believed to be impossible to obtain accurate replies, and also the simplification of others by their separation or combination in other forms.

Inquiries to Be Propounded.

The 13 principal questions are, briefly: 1, A description of the establishment; 2, time in operation and hours worked; 3, capital invested; 4, salaried employees; 5, wage earners, including pieceworkers, on the payroll December 15, 1909, distinguishing men, women and children; 6, wage earners, including pieceworkers, employed on the 15th day of each month, without distinction of sex or age; 7, salary and wage payments; 8, materials, mill supplies and fuel; 9, miscellaneous expenses; 10, products; 11, power; 12, fuel; and, 13, remarks.

Under the heading "description of establishment," manufacturers are requested to state the name of the establishment, the name of the owner, [illegible]on, the post office address of the general offices, [illegible]iod covered by the report, the character of the organization, the number of proprietors and partnership members, if a nonincorporated organization, or the number of stockholders if an incorporated organization, and the character of the industry. In reporting "capital invested," the return is to be made for that which is both owned and borrowed, divided among (*a*) land, building, machinery and tools; (*b*) materials, stocks in process, finished products, fuel and miscellaneous supplies; (*c*) cash, plus trading and operating accounts and bills receivable. Under the heading "materials, mill supplies and fuel," manufacturers are asked to report (*a*) total cost of all materials (other than fuel) and mill supplies used during the year; (*b*) cost of fuel and rent of power; (*c*) amount paid, if any, for freight on above which has not already been included; and (*d*) names of principal materials used.

Miscellaneous Expense Item Important.

The bureau regards the item of "miscellaneous expenses" as one of the most important in the schedule, which should include the items of (*a*) rent of factory or works; (*b*) taxes; (*c*) rent of offices and buildings other than factory or works; (*d*) rent of machinery; (*e*) royalties; (*f*) use of patents; (*g*) insurance; (*h*) ordinary repairs of buildings and machinery; (*j*) advertising; (*k*) traveling expenses; (*l*) all other sundry expenses, and (*m*) contract work.

Under the item of "products" the schedule names the following instructions:

> Give the selling value or price at the factory or works, and account for all products manufactured during the year (whether sold or not), including by-products. The principal products should be enumerated separately and the total value given for each, which value should include that of the containers, if sold with the goods. Under "All other products, including amounts received for custom work and repairing," should be reported the total value of all products, other than those for which separate values are given, together with amounts received for custom work and repairing and work done on materials furnished by others.

A special effort will be made by the Census Bureau to secure accurate statistics regarding power, and manufacturers will be requested to return all mechanical power employed, either owned or rented, under the items of (*a*) steam engines, (*b*) gas engines, (*c*) water wheels, (*d*) water motors, and (*e*) other power, specifying the kind. A new question under the heading of "power" is the name of the stream or lake from which water is obtained to generate power and whether direct or electric. This information will furnish data for a census of the country's water power plants and operations which Congress will probably be requested to authorize in the near future. In this connection the names and addresses of establishments supplying any part of the rented power will also be requested.

Under the heading of "fuel used" separate returns will be requested for (*a*) anthracite coal, (*b*) bituminous coal, (*c*) coke, (*d*) wood, (*e*) oil, (*f*) gas, and (*g*) other fuel, stating the kind. In reporting fuel by the ton, manufacturers are requested to state whether the gross or net ton is used. This question concerning fuel is a new one, and is expected to elicit replies affording valuable data on the fuel conservation question.

In addition to the general schedule the bureau will also prepare special schedules covering the details of the leading industries of the country. M. C.

R. F. Lang, 31 and 33 Broadway, New York, has been appointed sales agent for this country for the sale of Ferrool-Hocksit, a German preparation, patented in all countries, for soldering cast iron fractures. It can be applied by any workman knowing how to hard solder. The claim is made that a fracture thus soldered makes the broken part stronger than it was originally. Illustrated circulars show numerous instances of heavy and light castings which have been successfully treated in this manner.

The Japanese Commercial Commissioners at Pittsburgh.

The 39 honorary commercial commissioners from Japan who are visiting the United States by invitation of the associated chambers of commerce of the eight leading Pacific Coast cities reached Pittsburgh Friday morning, November 5. Under escort of members of the Pittsburgh Chamber of Commerce and representatives of local manufacturing companies the party was taken on a trip to leading Pittsburgh works. At Homestead Col. H. P. Bope, Samuel A. Benner, A. R. Hunt and other officials of the Carnegie Steel Company conducted the visitors through the plate, open hearth, armor plate and structural departments. The tapping of a 50-ton open hearth furnace, the operation of the 140-in. plate mill, large hydraulic shears, the 12,000-ton Bethlehem press, the large furnaces, the 10,000-ton forging press in the armor plate department and the hardening process were particularly interesting.

Luncheon was given at the Carnegie Hotel and there was some speech making by General Superintendent A. R. Hunt, C. A. O'Brien of the City Hall, President Lee S. Smith of the Pittsburgh Chamber of Commerce, Baron Eiichi Shibusawa and others.

In the afternoon most of the Japanese party visited the Westinghouse plants at East Pittsburgh and Wilmerding. At East Pittsburgh they were conducted by E. M. Herr, W. M. McFarland and others through the gas engine and turbine departments. A large turbine was shown under test with the latest attachment, the Melville-MacAlpine reduction gear. On the erecting floor of the Westinghouse Electric & Mfg. Company were several large electric locomotives. One of the orders being executed is from the Pennsylvania Railroad Company for service in its New York City terminal, while another is for large freight locomotives for the New York, New Haven & Hartford. Late in the afternoon the Westinghouse Air Brake Company's plant at Wilmerding was visited and the party inspected the foundry, machine, assembling and testing departments.

Other Pittsburgh District plants, particularly glass works, were visited by the Japanese delegation on Saturday, and there were various social events connected with the visit. The souvenirs distributed included a book of Westinghouse views and a booklet prepared by the Chamber of Commerce giving tonnages of various products turned out in the Pittsburgh District in 1907 and other industrial information.

The Panama Canal Cableways.

The building of the Panama Canal is now in its third and fourth stages. The first stage was the sanitation of the canal zone; the second the rebuilding of the Panama Railroad so as to supply facilities for transporting the spoil from the excavations to the dumps; the third the excavation of the canal, the fourth and last stage the building of the Gatun dam and locks, and the locks at Miraflores and San Miguel. On August 1 of this year the excavation (182,000,000 cu. yd., of which 40,000,000 cu. yd. available had been done by the French) had advanced to a point where only 101,000,000 cu. yd. remained to be done, which, as officially stated by Colonel Goethals, can be finished by August 1, 1911. The remaining excavation is proceeding at the rate of about 3,000,000 cu. yd. per month.

Keeping pace with the speed of excavation are the construction operations in connection with the Gatun dam and locks. The most important part of the mechanical equipment installed for building these locks is 13 high speed cableways, which were especially designed for this work by the Lidgerwood Mfg. Company, 96 Liberty street, New York. Upon five of these, those illustrated in Fig. 1, and known as the unloader cableways, will fall the brunt of the work, and upon their ability to handle the amount guaranteed, or more, depends the question of whether the canal will be completed and in operation on January 1, 1915, or earlier. The cableways have exceeded their guaranteed capacity by a large percentage, and the engineers in charge of the work are confident that it can be finished at an earlier date. Fig. 2 is a view of the tail towers of the unloader cableways showing the position of the barges and the location of the operator's platform.

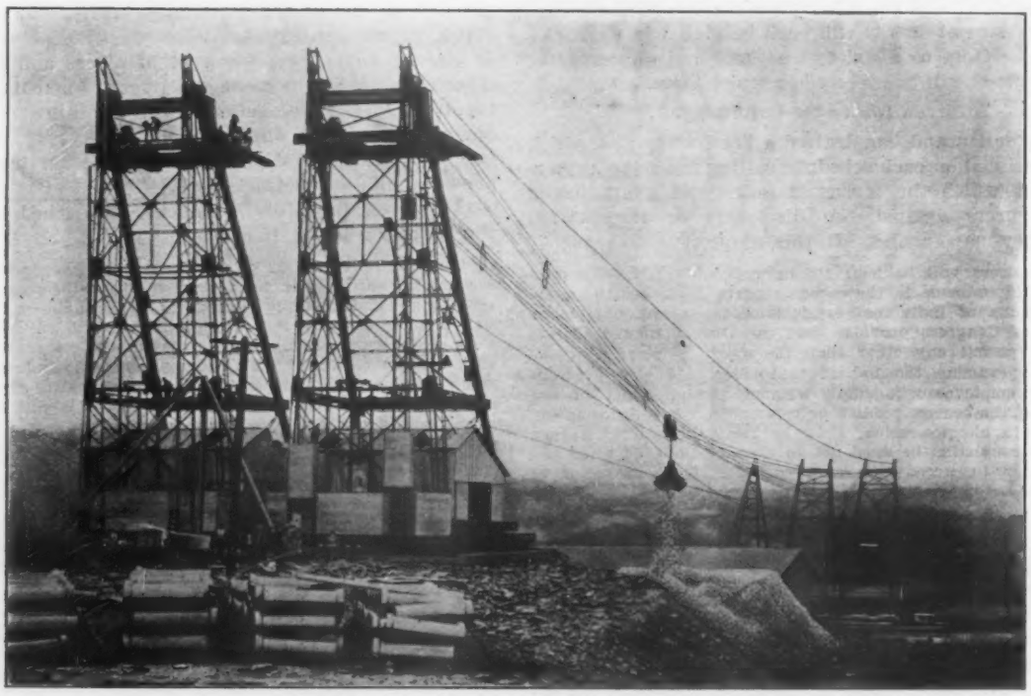


Fig. 1.—The Five Lidgerwood Unloading Cableways at Gatun, Isthmus of Panama.

The work of these five cableways is to handle the broken stone and sand which will be required for the walls and floors of the locks. There are six locks, each 1000 ft. long and 110 ft. wide. They lie side by side in flights of three, making a total length of more than 3000 ft. Together they provide a total lift of 85 ft., with some to spare for changes in the initial water level. In these locks there will be used 2,000,000 cu. yd. of broken stone, 1,000,000 cu. yd. of sand and 2,200,000 barrels of cement. The sand and stone arrive in barges on a branch of the old French canal, and the unloader cableway takes them out of the barges with grab buckets and delivers them 600 ft. or more away to heaps in the storage yard. From here

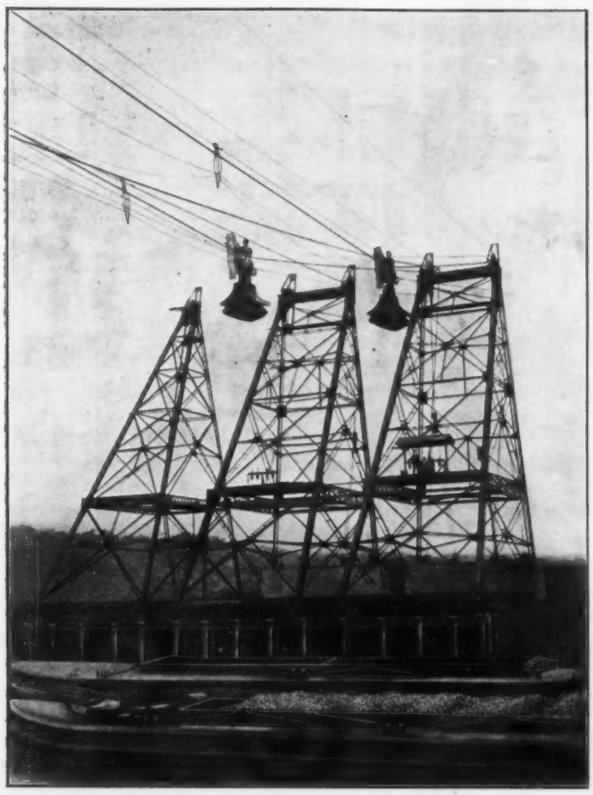


Fig. 2.—The Tail Towers of the Unloader Cableways.

them are taken by the cars of an automatically operated electric railway to the mixers, and from there the concrete is taken in other electric cars to where the second set of eight cableways, those for building the locks, can put it in place in the forms for the walls and floor.

The four cableways, Fig. 1, arranged in pairs on two sets of towers handle the broken stone and a single cableway with independent towers unloads the sand from the barges and deposits it on a storage pile. Each cableway has a span of 800 ft. In the duplex cableways the cables are 18 ft. apart. This corresponds with the distance apart of the traverse bulkheads in the barges. The cableways are all mounted on steel towers 85 ft. high. The towers are mounted on trucks and travel on tracks, so that each cableway performs the function of a traveling crane. The unloader cableways travel the length of the storage yard. Those for building the locks travel more than 3000 ft. They are all moved electrically, each pair in unison. From the carriage of each of the five unloader cableways is suspended an improved special 70 cu. ft. iron ore type excavating bucket, shown in Fig. 3, which grabs an average load of 54 cu. ft. The load is hoisted 85 ft., conveyed about 600 ft., dumped on the storage pile, and the carriage and bucket returned. This round trip has been made in 1 minute 8 seconds. The cableways were guaranteed to handle 50 cu. yd. an hour each, but have carried 90 cu. yd. in an hour, and the average operation up to date is 60 cu. yd. per hour. It is claimed that this average should be materially increased with practice, and the present record is declared to be double that of any cableway previously employed anywhere.

The machinery for operating is mounted in the head towers. It consists of two 150-hp. motors for each unloader cableway; one for opening, closing and hoisting the bucket, and the other one conveying the carriage. The lock building cableways each have a 150-hp. motor which does the hoisting and conveying, and a motor of 25 hp. to run the dumping device. Both the head and tail towers are propelled by motors. One man operates each cableway, and is stationed on an elevated platform in one of the towers commanding a clear view of the bucket or skip at all times and in all positions.

He controls the two 150-hp. motors by master controllers of the New York Subway type, and the air brakes by two levers operating magnet valves 800 ft. away. The physical effort of operation is stated to be so easy that the operator can comfortably maintain the high speed. In previous cableways this effort was fatiguing, and, although it was possible to attain a speed of 35 round trips per hour with mechanical levers, this could not be sustained for any length of time.

The high speed and consequent increase in the capacity of these cableways is due to the ease of operation, the rope-lead that simultaneously raises and traverses the bucket; the high speed shock absorber with which the fall rope carrier is equipped, and a new type of button stop for the fall rope carriers. The rope lead which simultaneously hoists and traverses the bucket causes the latter to move in a curved line corresponding somewhat to the hypothenuse of a triangle, instead of moving on the vertical and horizontal sides. Considerable increase of speed and diminution of travel is thereby affected. Fig. 4 gives a near view of two carriages and a bucket showing the fall rope carriers which are used to support the fall rope and the ropes for opening and closing the bucket. The fall rope carriers have a most important function to perform. Their purpose is to support the fall rope and the opening and closing ropes so as to allow of the full operation of the fall and bucket without interference by the weight of the constantly increasing length of the bite of the ropes as the carriage runs out.

When the carriage starts its trip the carriers are mounted on the saddle (one is shown on the saddle of

Fig. 3.—A View Down on a Barge from the Operator's Platform, Showing a Bucket Ready to Take a Load of Broken Stone.

Fig. 4.—Two of the Bucket Carriages.—One of Them Has Left the Last Cable Carrier and the Other Is Picking up a Carrier on Its Return Trip.

the carriage at the left of the illustration) and as the carriage runs out are automatically spaced on the cable by contact with various sized buttons, similar to those in Fig. 5. The rings in the heads of the carriers are made of proper diameters to engage with their respective buttons. On the return trip the carriers are picked up on the saddle. This button-stop method has been successfully tested experimentally with a fall-rope carrier running at a speed of 3000 ft. per min., and has an advantage over the chain type of carrier in that there are no loops of chain to buckle when they are collected. The buttons are prevented from slipping on the cable, when they receive the shock of engaging the carrier, by the insertion of a steel core in the part of the cable running through the button, which forms a wedge in the direction of blow. Cores are also inserted just above and below the button, causing the enlargement of the cable, which is noticeable in the illustration, and further insures it against slipping. The three cores used are shown on the front edge of the lower rack.

The high speed shock absorber with which the carrier is equipped permits the carriage to travel at the unusual speed of 2500 ft. per min., said to be more than double the speed of any previous cableway. This is the limit of speed allowed, although the cableways have frequently been operated at a speed of 3000 ft. per min., which at present is too severe for the fall-rope carriers. Some of the small pieces forming the heads of the carriers are being replaced with heavier pieces, which, it is believed, will admit of a higher speed.

Another feature of these cableways which is new is that the bucket is counterbalanced like a passenger elevator. Thus only the net load has to be hoisted and only enough power is required to do this and overcome friction and inertia. The eight cableways used for putting the materials in place in the lock walls are similar in span, hight, style of towers and method of control to those for unloading the materials, but they will never be called upon for such rapid work. While they will handle the entire amount of concrete and, besides this, the wooden forms and the many tons of old rails which are to be put into the concrete for reinforcement, there are eight of them, as against five of the others, and each will have much less to do. This is necessary, as the placing of concrete requires care and deliberation. The immense quantity of concrete material for the Gatun locks handled separately amounts to more than 3,300,000 cu. yd., while the total cubical contents of the Great Pyramid is 3,800,000 cu. yd.

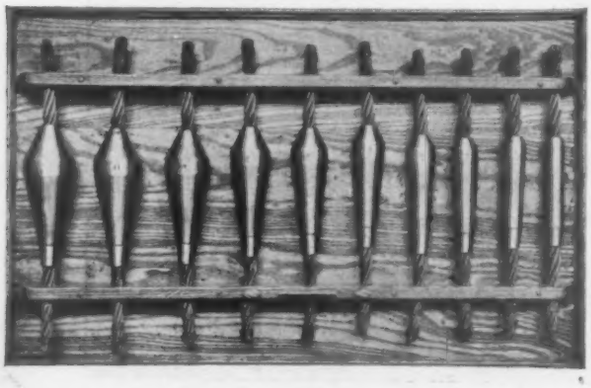


Fig. 5.—The Buttons of Graded Size Placed on the Cableways to Selectively Arrest the Cable Carriers.

Scherzer Rolling Lift Bridge Contracts.

The single track center pier swing bridge of the Baltimore & Ohio Railroad over the Cuyahoga River at Cleveland, Ohio, is to be removed and replaced by a double track Scherzer rolling lift bridge having a movable span of 200 ft. from center to center of bearings. This bridge will be the longest double track single leaf bascule bridge yet constructed. A bridge of the same type was recently selected and placed under contract for construction as the movable portion of a long causeway being built to connect Galveston with the mainland. The railroads using this bridge will be the Southern Pacific, the Santa Fé and the Gould systems and the Galveston & Houston Electric Railway. This bridge is designed to also accommodate highway traffic. Other American orders for railroad and electric railroad bridges are too numerous to mention here.

Among the prominent foreign orders received by the Scherzer Rolling Lift Bridge Company, Chicago, are a bridge for the Buenos Ayres Great Southern Railway to cross the Riachuelo River at Buenos Ayres, Argentina; an electric railroad and highway bridge for the city of Dublin, Ireland; a bridge to cross the Lachine Canal, Canada, for the use of the Canadian Pacific Railway. The bridge at Buenos Ayres is the third order received from the Buenos Ayres Great Southern Railway, and is a result of the satisfactory completion and operation of the first double track bridge of the Scherzer type placed in service a short time ago. The possibility of adding single, double or multiple track bridges to accommodate constantly increasing traffic is one of the advantages of the Scherzer rolling lift bridge as compared with the center pier swing bridge, which must be discarded, removed and replaced with a new bridge as soon as growing traffic requires additional tracks.

The Ballin Water Tube Boiler Company, Portland, Ore., has made arrangements with the Willamette Iron & Steel Works, Portland, for the manufacture of its boiler for the Pacific Coast States.

A New Fosdick Horizontal Boring, Drilling, and Milling Machine.

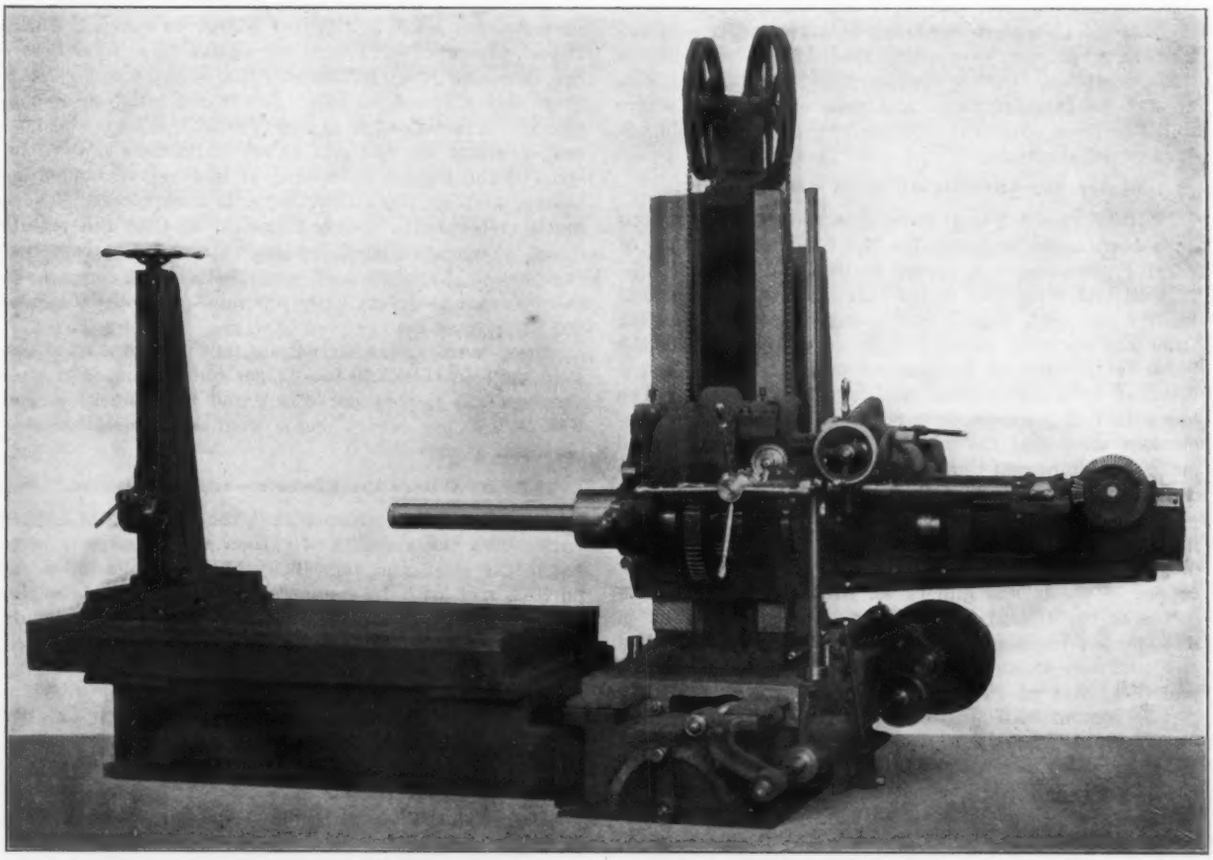
The horizontal boring, drilling and milling machine illustrated is the latest design of the Fosdick Machine Tool Company, Cincinnati, Ohio. It is known as style H, and is built in two sizes, Nos. 1 and 2, and is capable of performing all operations of drilling, milling, tapping, boring, facing, &c., on light and heavy work.

The column carrying the spindle head has horizontal movement on the bed by hand or power in both directions; also a quick forward and return movement by power, operated by a lever conveniently located on the front of bed. The head, which is counterbalanced and provided with a safety chain, has vertical movement on the column by hand or power in both directions. For quick adjustment the pilot wheel on the front of the spindle head is used.

The spindle sleeve runs in adjustable bronze bearings of spindle speeds, ranging from 4 to 200 rev. per min. are secured either through the cone pulley or speed box by using a double speed countershaft. Following are the principal dimensions:

	No. 1 machine.	No. 2 machine.
Diameter of spindle bar, inches	3½	4
Spindle bore, Morse taper	No. 5	No 6
Traverse of spindle, inches	28	30
Vertical adjustment of head on column, in.	36	54
Horizontal adjustment of column on bed, in.	36	62
Size of table, inches	42 x 72	42 x 120
Ratio of back gears	13.6 to 1	13.6 to 1
Ratio of driving shaft to spindle	2.24 to 1	2.24 to 1
Weight, pounds	14,000	16,000

For a constant speed motor drive a 7½-hp. motor, running at 825 rev. per min., is mounted on the rear of the machine and is connected through gearing to the speed box. For a variable speed motor drive a 7½-hp. motor, with speeds of from 400 to 1600 rev. per min., is used, and is mounted on the rear of the machine and connected through gearing direct to the driving shaft. The controller is mounted within easy reach of the operator. All gears are steel and all bearings are bronze bushed.



The New Style A Horizontal Boring, Drilling and Milling Machine Built by the Fosdick Machine Tool Company, Cincinnati, Ohio.

and has a thread cut on its front end to hold chucks, large milling cutters and facing heads for heavy work. The spindle bar which passes through the sleeve is driven by two keys, and is fitted with a No. 5 and 6 Morse taper, and provided with a Cotter key to be used when driving large boring bars. It has a power and hand feed in both directions. The spindle driving gears are located on the spindle sleeve close to the work. This construction minimizes the torsional stresses in the spindle, and is especially advantageous when using large milling cutters, as it practically eliminates all chattering. The back gears are of the tumbler type, and can be engaged while the machine is running by a lever conveniently located on the head.

The outer support for boring bars has horizontal and vertical movement by hand and is provided with scales, corresponding to those on the main column and bed. The table, in which the T slots are planed, is stationary and securely bolted to the base and bed, insuring perfect alignment with the spindle at all times.

There are eight changes of feed, ranging from 0.007 to 0.25 in. per revolution of the spindle. Sixteen changes

The National Rolling Mill Company, Mansfield, Ohio, will have its capacity increased nearly 50 per cent. by equipment now in course of installation. The new galvanizing department has been placed in operation, a galvanizing pot having been installed which has a capacity of 25 tons of galvanized sheets every 24 hours. When the new stands of rolls have been placed in operation the mill will be equipped to turn out 1000 tons of sheet steel a month.

The monthly publication *Steam*, devoted to the interests of the steam trade, has been purchased from the Gage Publishing Company by the Ferguson Publishing Company, 114 Liberty street, New York, and will be published under the latter name, beginning with the current issue. The architects' and automobile editions of the *Buyers' Reference* have also been purchased by the Ferguson Publishing Company.

Physical Properties of Iron-Copper Alloys.*

BY CHARLES F. BURGESS AND JAMES ASTON.†

The influence of copper on iron and steel has for long been a subject of controversy and contradiction. It is only comparatively recently that the effect has been investigated systematically and some of the doubt eliminated.

The prevalence of appreciable quantities of copper in the ores of certain districts makes important a knowledge of its effect, detrimental or otherwise, when present in small amounts. Also, the intimate relation of copper, nickel and iron, and the beneficial effect of the addition of nickel to iron and steel, create an interest in the influence of larger percentages.

The older opinion was that copper was deleterious; that its chief effect was analogous to that of sulphur in that it rendered iron red short and destroyed its welding power. This view was taken by many eminent metallurgists, some even contending that 0.5 per cent. makes steel worthless. Others claimed that the influence was greatly exaggerated, and instances were cited where rolled sections of 0.50 to 0.75 per cent. of copper did not display red shortness.

Systematic Investigations in Recent Years.

Within recent years more systematic investigations have been made to determine the effect of additions of varying percentages of copper to iron and steel.

Ball and Wingham[1] tested four steels with from 0.85 to 7.17 per cent. copper and a carbon content varying from 0.10 per cent. in the former to 0.71 per cent. in the latter, and noted an increase of tensile strength and a decrease of ductility with the increase of copper. The bar with 7.17 per cent. copper was red short. Their conclusions were that the principal effect of copper was to make steel hard and that copper within reasonable limits did not materially affect the mechanical properties.

A. L. Colby[2] says that small percentages of copper have no deleterious effect upon the physical properties of steel. He cites various steels of about 0.5 per cent. copper in shafts and gun tubes, which met the requirements of the United States Navy. It was also used in ship plates, passing the usual tests required of carbon steels. These steels welded successfully and flanged cold and there was no red shortness in bars or rails with a copper content of 0.39 to 0.49 per cent.

W. Lipin[3] states that iron with a copper content up to 3 per cent. is readily worked, but that there is red shortness at 4.07 per cent. copper. Between 7 to 10 per cent. copper the material cracked badly, and fell to pieces under the hammer. With an increase of copper up to 3 per cent. the tensile strength increased from 26 tons per square inch to 46 tons per square inch, with a decrease of elongation from 27.8 per cent. to 13.3 per cent. He also noted that with an increase of carbon in the steel the maximum percentages of copper must be decreased; also that copper does not affect the welding.

Stead[4] made a very thorough investigation of the influence of copper in steel rails and plates, since, he claimed, the general belief that copper was deleterious was an unjustified prejudice. His article goes fully into the previous work and impressions. He finds that copper between 0.5 and 1.5 per cent. is not detrimental either hot or cold; that 2 per cent. copper makes steel more liable to show the effects of overheating; that small quantities raise the tenacity and the elastic limit and reduce the elongation, but not greatly, however, for small percentages of copper; also that there is no great liability to fracture by shock.

Papers of Stead and Wigham,[5] and of Wigham,[6] deal with the effect of copper in cold wire drawing, and come to the conclusion that copper up to 0.25 per cent. is no disadvantage in the manufacture of the best classes of steel wire.

Wigham, in the last article mentioned above, brings out the important point that Professor Turner, in the discussion of the former article of Stead and Wigham, says that where copper is present in ores it is found in association with sulphur. Consequently discrepancies in the earlier tests may be due to this sulphur and not to the direct effect of the copper. This fact, together with that of the increase of red shortness with an increase of carbon, may explain the differences of opinion resulting from the earlier observations.

All of the above research was to excuse the presence of the copper; to break down a seeming prejudice. An investigation with a different object is that of Pierre Breuil, the results of which were given in a paper before the Iron and Steel Institute.[7] His object was to see if there was a beneficial effect due to the addition of copper, and was suggested by the favorable influence of copper on steels for railroad axles, which was noticed on some of the French railroads. It is a very extended research, and, as the author says, is a supplement (very much elaborated) to Stead's work, in that the results agree. Being the most exhaustive and latest contribution to our knowledge of copper steels, we shall have the occasion to refer to the results frequently throughout this discussion.

Breuil's work was carried out on four series of steels, mild steel (carbon 0.10 to 0.17 per cent.), semi-mild steel (carbon 0.28 to 0.41 per cent.) and hard steel (carbon 0.56 to 0.79 per cent.), and a final series with about 1 per cent. of carbon.

Tests Where the Elements are a Minimum.

In view of the evidence that the influence of copper varies with the amounts of carbon and of sulphur present in the steel, and very likely also with the other impurities met with in commercial materials, it is of interest to record the results of tests where these elements are a minimum. This study is a part of an extended investigation carried on in the Chemical Engineering Laboratories of the University of Wisconsin under a grant of the Carnegie Institution of Washington, on electrolytic iron and its alloys. Much of the data and results here enumerated were obtained by Messrs. Watts, Kowalke and Thickens.

The primary element in the production of these alloys is iron of high purity, obtained by double electrodeposition. The nature of the material is given in the following table:

Per cent.	Anode.	Double refined.	Electro fused and forged.
C	0.260	0.012	0.047
S	0.007	None	0.005
Si	0.019	0.013	0.062
P	0.007	0.004	0.016
Mn	0.021	None	None
Iron	(difference)	99.971	....

As will be seen from this table, the iron content is 99.97 per cent. The copper used is also of high purity, being obtained by electrodeposition.

The charges were made up in dense electrically shrunk magnesia crucibles, each inclosed in a graphite container. The crucible was covered with a magnesia lid and was buried in an electric resistor furnace. The charges in the crucible were brought to fusion from the cold mixture, held at a high temperature for some time and allowed to cool in the furnace. These was no agitation of the charge and the resultant alloy was due entirely to diffusion. The ingots, weighing about 500 grams (1 lb.), were forged into rods about ⅝ in. in diameter by 18 in. long, under the steam hammer ,and were then turned or ground into the finished test bars.

In spite of precautions to prevent contamination of the charge, some carbon was absorbed. Evidence is that

* A paper presented at the meeting of the American Electrochemical Society, New York City, October 28-30, 1909.

† Chemical Engineering Laboratories, University of Wisconsin, Madison.

[1] Iron and Steel Institute, 1889, No. 1.
[2] *The Iron Age*, November 30, 1899.
[3] *Stahl und Eisen*, Vol. 20.
[4] Iron and Steel Institute, 1901, No. 1.
[5] Iron and Steel Institute, 1909, No. 2.
[6] Iron and Steel Institute, 1906, No. 1.
[7] Iron and Steel Institute, 1907, No. 2.

it was set free by the equilibrium reaction, Fe + CO = FeO + C. The amount is small, however, and numerous analyses show that it may be taken as well under 0.10 per cent. The other impurities, such as manganese, silicon and sulphur, are negligible. In the tests here enumerated, therefore, the effect may be considered as due to the added element only.

Forging.

A wide range of alloys of varying copper content was made. The observations made in the forging are as follows: Alloys up to 2 per cent. of copper forge well at low heats. Those from 2 per cent. to 7 per cent. will not forge at a low heat, and rather poorly at white heat, the ease of workability varying inversely as the percentage of copper. From 7 per cent. to 75-80 per cent. the alloys may be classed as non-forgeable. Between 80 and 100 per cent. they will forge at a fair red heat, but not at a normal forging heat for iron.

In the earlier work alloys above 5 per cent. could not be forged. However, in later tests, in the trial of many alloys of 5 to 10 per cent. of copper at all heats, it was found that with care and a high heat (welding) a 7 per cent. bar could be forged, or, even rarely, an 8 per cent.

The lower percentages (below 5) will weld easily in forging, and some bars of 7 per cent. copper were welded while forging. All alloys up to 7 per cent. copper could be welded in an electric welder.

Segregation.

The forgeable samples between 0 and 8 per cent. of copper and a few of the alloys of high copper and low iron were made into test bars for investigation of the tensile strength. Analyses were not made upon all bars;

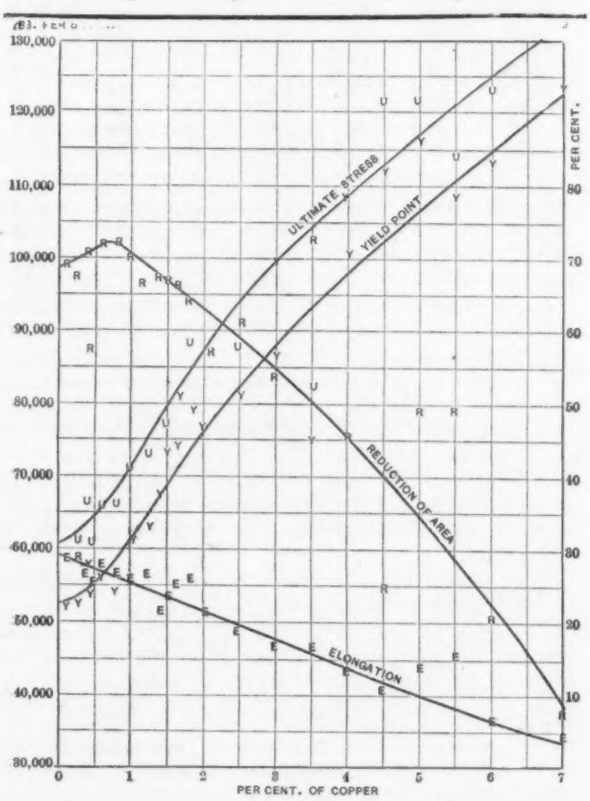


Plate I.—Tensile Strength of Iron-Copper Alloys, Unannealed.

rather, random samples of the entire range of composition were sent to Booth, Garrett & Blair of Philadelphia, whose valued assistance in this investigation is acknowledged. Their report is given below:

Analyses.

Bar.	Cu added.	Analysis.	Bar.	Cu added.	Analysis.
147B	0.1	0.089	158G	2.0	2.005
158A	0.2	0.202	158I	4.0	3.990
158B	0.4	0.422	158J	5.0	5.070
158C	0.6	0.592	158K	6.0	6.160
158D	0.8	0.804	147U	7.0	7.050
147H	1.0	1.006	86F	95.0	94.340
147J	1.5	1.510			

As will be seen from the tables, the agreement between the added and the actual copper content is exceedingly close. The analytical samples were taken from the turnings obtained in the machining of the test bars after the forging of the ingots. This close agreement after such a method of selection would indicate an entire absence of segregation; also that the materials alloy very well up to a copper content of 7 per cent. This is in accord with the work of the earlier investigators. In view of this close agreement it may be assumed that

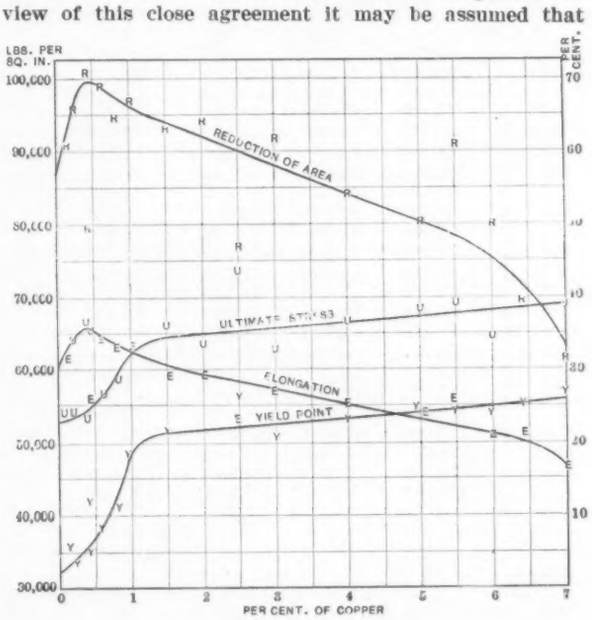


Plate II.—Tensile Strength of Iron-Copper Alloys, Annealed.

the actual copper content of the alloys is the same as the added amount.

Hardness.

The hardness tests are merely qualitative, being observations made in the machining, sawing and filing. In machining, the alloys with low percentages of copper worked very easily. The hardness increased with the increase of copper until at 5 to 7 per cent., while it was still possible to turn in the lathe, it was with some difficulty. There were the same evidences in the sawing and filing tests, the high copper being classed as extremely hard to saw.

Breuil's investigations show that the hardness does not result through a lowering of the points of transition, thus leaving the steels in a martensitic state, as might be supposed. The structure is a fine pearlite, with a fibrous cementite which is liberated with increasing copper, and this explains the increasing hardness.

Wedding[a] says that copper and sulphide of copper prevent the formation of pearlite and promote the formation of crystals of cementite. It is due to this fact that there is greater hardness of iron when copper and sulphur are present. These explanations seem hardly sufficient to account for the hardening which we have observed without the presence of either copper or sulphur, and we expect to make a metallographic study with the hope of throwing a little light upon the subject.

Tensile Strength Tests.

Of the bars cut from each rod for the tensile tests an equal number were reserved for tests as forged and after annealing. In annealing, the samples were packed in a magnesia lined graphite box and were heated in an electric resistor furnace. The temperature was brought up to 900 degrees C. and held at this point for several hours, and several hours more were needed for the slow cooling in the furnace. The test samples were approximately from 0.3 to 0.4 in. in diameter, with a free length of 2 in. The diameter used in the calculations is the mean of several readings with micrometer calipers. The tests were made on a Riehle 100,000-lb. power-driven machine. The load was applied very slowly and the beam kept in balance. The yield point was obtained with dividers, and was taken as that point at which a perceptible permanent stretch had taken place. This was checked by the drop of the beam.

[a] *Stahl und Eisen*, December, 1906.

The summary of the results of these tests is given in the Tables I. and II. and in Plates I. and II. The detailed data are not given, also no account is taken of bars which showed abnormal results, due to flaws, &c.. in certain instances which are no doubt somewhat abnormal, but not so much so as to be rejected from the tables. Also, where there are a sufficient number of samples for a good average, the results fall well in line.

TABLE I.

Tensile Strength—Iron-Copper Alloys—Unannealed.

Per ct. copper.	No. of samples.	Yield point.—Pounds. Max.	Min.	Aver.	Ultimate stress.—Pounds. Max.	Min.	Aver.	Elongation.—Per cent. Max.	Min.	Aver.	Reduction of area.—Per cent. Max.	Min.	Aver.
0.1	3	56,600	45,400	52,580	64,000	60,300	61,180	30.0	27.5	28.5	70.9	66.7	69.2
0.2	5	55,600	50,700	52,930	63,750	60,000	61,470	36.5	24.5	28.7	73.2	56.9	67.2
0.4	2	59,700	56,100	57,900	67,250	66,400	66,825	29.5	23.0	26.2	72.1	69.4	70.7
0.45	2	54,800	53,100	53,950	62,700	58,800	60,750	27.0	24.0	25.5	67.7	47.2	57.4
0.6	2	57,750	54,600	56,170	67,000	64,750	65,875	27.5	27.5	27.5	72.8	71.5	72.1
0.8	2	55,500	53,800	54,650	67,500	65,100	66,300	27.0	25.5	26.2	72.5	71.7	72.1
1.0	5	63,300	56,800	61,290	70,800	68,300	71.380	28.0	21.0	25.8	72.0	66.8	70.3
1.2	2	66,300	59,500	62,900	74,600	72,300	73.400	28.0	24.5	26.2	68.8	64.5	66.6
1.4	2	68,100	67,300	67,700	78,600	76,600	77,600	25.0	18.0	21.5	70.0	64.5	67 2
1.5	3	77,250	70,000	73,920	78,800	76,200	77.300	26.5	20.5	23.5	68.6	64.5	66.9
1.6	2	75,100	73,300	74,200	82,750	79,100	80.925	25.0	25.0	25.0	66.6	66.2	66.4
1.8	2	81,100	77,600	79,350	91,000	86,000	88,500	27.0	24.0	25.5	66.3	61.8	64.0
2.0	3	78,800	73,400	76,930	89,500	82,250	87,010	23.5	17.5	21.2	59.5	54.5	57.0
2.5	2	81,100	81,000	81,050	89,400	86,400	87,900	19.0	18.5	18.7	62.8	59.1	53.8
3.0	6	95,100	73,750	86,810	105,000	83,750	99,640	24.0	12.5	16.7	65.6	36.1	53.8
3.5	1	.....	.....	75,400	.....	.....	82,300	...	...	16.0	...	...	72.7
4.0	5	111,100	92,700	100,560	120,700	99,200	108,640	17.5	8.0	13.5	52.3	24.8	45.6
4.5	2	117,800	106,400	112,100	127,900	115,500	121,700	17.0	4.5	10.8	47.2	3.9	25.1
5.0	2	119,700	113,000	116,350	123,800	120,000	121,900	15.0	14.0	14.5	50.1	48.3	49.2
5.5	2	114,700	102,300	108,500	122,800	105,200	114,000	15.5	15.0	15.2	53.8	46.6	49.7
6.0	3	124,200	103,000	113,400	136,700	107,500	122.900	9.0	4.5	6.5	36.5	4.1	20.3
7.0	2	128,800	117,000	122.900	133,800	131,000	132,400	6.0	2.0	4.0	12.9	1.7	7.3
8.0	2	146,800	133,500	135,100	160,000	137,500	148,750	...	...	0	...	...	0

TABLE II.

Tensile Strength—Iron-Copper Alloys—Annealed.

Per ct. copper.	No. of samples.	Yield point.—Pounds. Max.	Min.	Aver.	Ultimate stress.—Pounds. Max.	Min.	Aver.	Elongation.—Per cent. Max.	Min.	Aver.	Reduction of area.—Per cent. Max.	Min.	Aver.
0.1	2	40,750	34,000	35,570	56.500	51,600	54,050	35.0	28.0	31.5	62.2	58.3	60.2
0.2	4	36,850	31,800	33,660	56,000	52,700	54,020	36.0	29.5	34.1	67.7	62.7	65.6
0.4	2	35,700	35,100	35,400	53,700	53,100	53,400	37.5	34.0	35.7	72.1	69.3	70.7
0.45	2	42,250	41,250	41,750	66,300	64,600	65,400	26.0	25.0	25.5	53.6	46.0	49.8
0.6	2	38,400	38,300	38,850	56,600	56,500	56,550	36.5	32.0	34.2	69.0	68.8	68.9
0.8	2	41,300	40,700	41,000	59,750	57,400	58,570	34.0	32.0	33.0	65.1	64.7	64.9
1.0	4	54,800	46,400	48,920	63,900	61,100	62,350	34.0	30.0	32.6	68.3	66.1	66.8
1.5	6	58,100	48,100	51,570	70,500	62,100	65,720	33.5	22.0	29.2	65.1	59.3	63.1
2.0	6	54,300	49,400	51,620	65,100	60,500	63,200	31.5	27.5	29.5	68.1	62.0	64.4
2.5	1	.....	.....	56,200	.....	.....	73.500	...	...	23.0	...	...	47.3
3.0	7	53,800	48,700	50,890	67,600	59,000	62,360	33.5	10.5	26.9	69.1	46.3	61.7
4.0	5	57,100	49,600	53,570	70,000	62,700	66,540	28.0	22.0	24.8	65.3	39.3	54.2
4.6	4	57.600	50,700	54,460	74,700	62,400	68,250	29.0	20.5	24.2	62.9	29.1	50.3
5.5	1	.....	.....	54,800	.....	.....	69,300	...	...	25.0	...	...	60.4
6.0	3	55,500	52,750	54,420	65,600	62,500	64,530	25.5	18.0	20.8	59.0	39.2	49.9
6.45	2	55,750	54,600	55,170	69,700	69,200	69,450	25.5	16.5	21.0	48.1	30.5	39.3
7.0	2	57.150	56,750	56,950	70,900	67,900	69,400	20.0	14.0	17.0	40.8	21.7	31.2
7.5	1	.....	.....	60,200	.....	.....	79.000	...	...	16.5	...	...	34.2

The results enumerated are the yield point, the ultimate strength, the percentage of elongation in 2 in. and the percentage of reduction of area at fracture. In order to show the consistency of the data there are also given the maximum and minimum values for each of the above items, together with the average of these items for the number of samples enumerated in a separate column. The plates are plotted from the averages of the tables and it is not to be expected, considering the many variable which might arise, in tensile strength tests, that any series will give a simple curve. It is merely hoped to show the tendency of the increasing percentage of copper. The values of the yield point, ultimate strength, elongation and reduction of area are designed as points used in plotting the curves by the appropriate letters Y, U, E and R.

The Unannealed Bar Tests.

From the curves of Table I it will be noted that the rise in the ultimate strength and the elastic limit is almost a linear function of the percentage of copper. The ultimate strength increases from 61,180 lb. per square inch at 0.1 per cent. copper to 132,400 lb. at 7 per cent. The yield point rises from 52,580 to 122,900. There is a corresponding fall in the elongation from 28.5 per cent. at 0.1 per cent. copper to 4 per cent. at 7 per cent. copper. The reduction of area increases slightly from 69.2 per cent. at 0.1 copper to 72.1 per cent. at 0.6 and 0.8 per cent. copper; from this point it falls to 7.3 per cent. at 7 per cent. of copper.

From Table I it will be noted that the ratio of maximum and minimum values to the average is good, except The greatest variation is at 3.5 per cent. of copper, but here there is only one bar, which is clearly abnormal, with its low ultimate strength and elastic limit and its high reduction of area. The greatest variations from the curve lie above 4 per cent. copper, and this is to be expected, especially in the unannealed samples, since here we are almost beyond the limit of satisfactory workability.

The results of these tests indicate a high tensile strength which increases with the percentage of copper. The alloys are rather brittle, as indicated by the elongation and the reduction of area. Also, the elastic ratio (ratio of the elastic limit to the ultimate strength) is large, varying from 0.86 at 0.1 per cent. copper to 0.93 at 7 per cent. copper.

The Annealed Bar Tests.

The results of annealing are given in Table II and Plate II, and the effect is very marked, especially for the higher percentages of copper. There is greater consistency in the results, as is to be expected, and the points fall fairly well in line on the curves.

The greatest deviation from the curves is at 2.5 per cent, and 5.5 per cent. of copper, where there was only one bar of each for the test. The maximum and minimur figures of the table are not widely different.

Up to 1 per cent. copper there is a marked increase of the elastic limit and the ultimate strength with the additions of copper and no falling off in the elongation or reduction. In fact, the latter increase to a maximum at 0.4 per cent. of copper. Beyond 1 per cent. the curves bend sharply and become more nearly horizontal, being

a linear function of the percentage of copper. The elongation and reduction of area fall off in accordance.

Between 1.5 per cent. and 7 per cent. of copper the elastic limit increases from 51,570 to 56,950 lb., the ultimate from 65,720 to 67,900 lb., while there is a decrease in the elongation and the reduction of area. Between 0.1 and 1.5 per cent. of copper the elastic limit rises from 35,570 to 51,570 lb.; the ultimate strength from 54,050 to 65,720 lb.; while the elongation and the reduction of area remain about the same. Breuil mentions the 4 per cent. alloy as worthy of further study, and this is no doubt true, since he observes very high values, as indicated by the following table, where the results are given for his mild steel series (carbon = 0.10 to 0.17 per cent.) as rolled, and as annealed at 900 degrees C.:

TENSILE STRENGTH—BREUIL.

Unannealed.

Per cent. Cu.	Yield point. Pounds per square inch.	Ultimate stress. Pounds per square inch.	Elongation. Per cent.	Reduction area. Per cent.
0	.....	.....	...	..
0.5	55,000	66,860	25.5	66
1	58,900	70,200	26.5	60
2	67,300	88,700	16.0	58
4	97,600	109,500	13.0	46
		Annealed		
0	35,800	54,900	30.3	63
0.5	38,200	59,000	28.0	60
1	54,800	69,500	26.0	57
2	58,700	70,300	25.0	58
4	65,000	71,500	22.0	63

A comparison of these figures with the results of our researches shows a great similarity, and in plotting the figures there is a very close agreement. In his 4 per cent. alloy as unannealed, to which Breuil calls particular attention, there is an elastic limit of 97,600, an ultimate strength of 109,500, an elongation of 13 per cent. and a reduction of area of 46 per cent. In our tests the results for corresponding material are: Elastic limit, 100,560; ultimate strength, 108,640; elongation, 13.5 per cent., and reduction of area, 45.6 per cent. For the annealed sample Breuil gives the elastic limit, 65,000; ultimate strength, 71,500; elongation, 22 per cent.; reduction of area, 63 per cent. Our results are: Elastic limit, 53,750; ultimate strength, 66,540; elongation, 24.8 per cent.; reduction of area, 54.2 per cent. In our tests the annealing shows a greater effect, resulting in less strength with greater ductility; and the same is true in the comparison for all percentages of copper.

Annealed Samples Show Greatest Value Between 1 and 2 Per Cent.

While Breuil lays particular stress on the 4 per cent. alloy, our results would seem to indicate the greatest value between 1 and 2 per cent. for the annealed samples. The very sharp rise of the elastic limit and the ultimate strength at this percentage gives values but very little less than those for higher copper content; also there is a removal from the region where the forging and welding properties are poorer with consequent uncertainties of result. Likewise, between 1 and 2 per cent. the elastic limit and the reduction of area are very high.

It would hardly be advisable to work with 1 per cent. of copper, since this is on the edge of the limit, where there is liable to be a fall to the lower values obtained with lower percentages of copper. At 1.5 per cent. we are far enough removed so that the slight differences of composition to be met in practice would not bring the material into a dangerous region. Also, the elastic ratio of 0.78 is slightly lower than for the 4 per cent. alloy, where it is 0.81.

We would have considerable hesitation in bringing forward this point without a vast number of tests for confirmation, but for the fact that an observation of Breuil's results indicates the same condition. He has perhaps noticed this fact, but makes no mention of it in his article. As will be seen from the table of his results which is given above, there is a sharp increase between 0.5 per cent. and 1 per cent. of copper, where the elastic limits are 38,200 and 54,800, respectively, and the ultimate strengths 59,000 and 69,500. Again, we note but little change in the elongation and reduction of area. Between 0 and 0.5 per cent. and between 1 per cent. and 2 per cent. the change is not marked. The fact that two independent investigations give this result seems fairly conclusive of the effect.

The Difference Between Unannealed and Annealed Samples Suggests a Possible Intermediate Heat Treatment.

Another fact to be noted in our tests is the marked difference between the unannealed and the annealed samples. It would indicate that there is a possible intermediate heat treatment which, not being so drastic in its effect as our long annealing, would give intermediate values, and thus approximate the nickel steels. This condition might be reached in commercial rolling, where heavier masses of metal leave the material in a condition analogous to that resulting from a partial anneal.

To compare the copper-iron with the nickel alloys we may quote Waddell's extensive investigations.[9] In considering the use of nickel steel for bridge building, he mentions a steel with about 3.5 per cent. nickel, carbon 0.38 per cent., the values for which may be taken as: Elastic limit, 60,000 lb. per square inch; ultimate, 105,000 lb. per square inch; elastic ratio, from 0.55 to 0.60. These values are for sections as rolled without heat treatment and working at a somewhat low ductility, as shown by the figures—15 per cent. for nickel steel, 27 per cent. for carbon steel (in 8 in.) and a reduction of area of 41 per cent. for nickel, compared with 55 per cent. for the carbon steels. With the carbon reduced to 0.15, the value becomes: Elastic limit, 45,000; ultimate, 70,000; elongation, 25; and for (carbon = 0.45) the elastic limit is 65,000, the ultimate 115,000 and the elongation 12 per cent.

These values are higher than ours for the copper-iron alloys, but are not in direct comparison. Our own figures for a nickel-iron alloy made under the same conditions as the copper-iron series are given in the following table, where the 4 per cent. nickel is compared with the 1.5 per cent. and 4 per cent. copper alloys. There is also given Hadfield's test of an alloy of 3.82 per cent. nickel and carbon = 0.19 per cent.[10]:

	Elastic limit	Ultimate strength.	Elastic ratio.	Elongation. Per ct.	Reduct'n area. Per ct.
	Unannealed.				
4.00 Ni	67,000	76.000	0.88	28.5	68.6
1.50 Cu	73,920	77,300	0.95	23.5	66.9
4.00 Cu	105,560	108,640	0.97	13.5	45.6
3.82 Ni	62,720	82,800	0.76	30.0	54.0
	Annealed.				
4.00 Ni	57,000	69,000	0.83	26.5	64.8
1.50 Cu	51.570	65,720	0.79	29.2	63.1
4.00 Cu	53,570	66,540	0.81	24.8	54.2
3.82 Ni	56,000	73,920	0.76	35.0	55.0

The above values for the nickel alloys are less than are commonly assigned to commercial materials where the carbon is a factor. The results are very comparable to those of the copper-iron series made under identical conditions.

Waddell, in his paper, shows that there is an economic advantage in the use of the nickel steels in comparison with the carbon steels ordinarily used, since their increased cost is more than offset by the less weight required, due to their increased strength. Our results and comparisons would indicate that the copper-iron alloys are also worthy of consideration and might be comparable to the nickel steels in use, even if the strength should not reach such high values as those of the nickel. A 1.5 per cent. copper alloy is of promise, since the smaller percentage required and the lessened cost per pound of copper as compared with nickel would result in a lessened cost of construction, even if there is some increase in tonnage required because of the slight decreased strength per equal weight.

The Tennessee Coal, Iron & Railroad Company made a new record for pig iron production in October, the output of its 10 active furnaces being 73,158 tons. A record output was also made at the open hearth steel plant of the company at Ensley, Ala.

[9] American Institute Civil Engineers, September, 1908.
[10] Institution Civil Engineers, March 28, 1899.

The Hill Bituminous Gas Producer.

To gasify bituminous coal, lignite or peat, and even low grade fuels, such as anthracite screenings or slack bituminous coal, the Hill-Hupfel Engineering Company, Inc., 30 Church street, New York City, has developed a producer gas plant of which Figs. 1 and 2 are a divided view. Matched side to side the two illustrations show the complete plant.

The Generator.

The generator combines the good features of a down-draft producer with the simplicity of an ordinary up-draft producer, and in addition has the advantages of being mechanically fed, automatically stoked and automatically relieved of its ashes. It consists of a steel shell, the upper section of which is mounted on four cast iron legs; the bottom section supported by four grooved rollers, revolves on a track, and is driven by worm and gear. The producer is lined with a 12-in. fire brick lining, back of which is ½ in. of mineral wool to allow for expansion and contraction. The top is cast iron, water cooled and the bottom is of the open water sealed type.

Through the center of the producer, and supported by a water cooled casting, is a dividing wall, on one side of which the coal is admitted to a distilling chamber, and from the other side is taken the gas outlet. The dividing wall is so arranged that there is a greater area at the bottom of the distilling chamber, allowing the coal to feed freely and providing ample room for expansion during the process of coking.

A mechanically operated hopper is mounted above the distilling chamber, to which connections can be made from the coal storage bin. Between the hopper and the top of the producer is mounted an induction steam blower. The bottom of the producer is a stationary iron tuyere. Another induction steam blower is attached to the outer end of the tuyere pipe. The blowers are operated by a jet of steam, which carries in with it a column of air. They can be adjusted to take into the generator any required mixture of steam and air or to admit steam only. Fuel is fed from the hopper into the distilling chamber by the mechanical feed shown in the neck of the hopper, maintaining a proper hight of the burning mass in the distilling chamber.

The current of air and steam from the upper blower carries the gases downward through the incandescent body of the fuel zone at the bottom of the dividing wall, where the heavy hydrocarbons are converted into a fixed gas, which mingles with the free hydrogen and carbon-monoxide produced by the dissociation of the steam and partial combustion of the fuel produced by the oxygen of the air admitted. In this heated zone the tar is largely eliminated, and the soot is mostly deposited or filtered out. The downward current of gases is met and joined at the bottom of the dividing wall by an upward current from the tuyere, produced by the blower attached. The proportions of air and steam from this blower can be adjusted to produce a gas nearly similar to that produced from the upper part of the burning pile, or steam alone can be admitted from below, producing a gas rich in hydrogen, while the temperature of the mass is maintained by the upper blast.

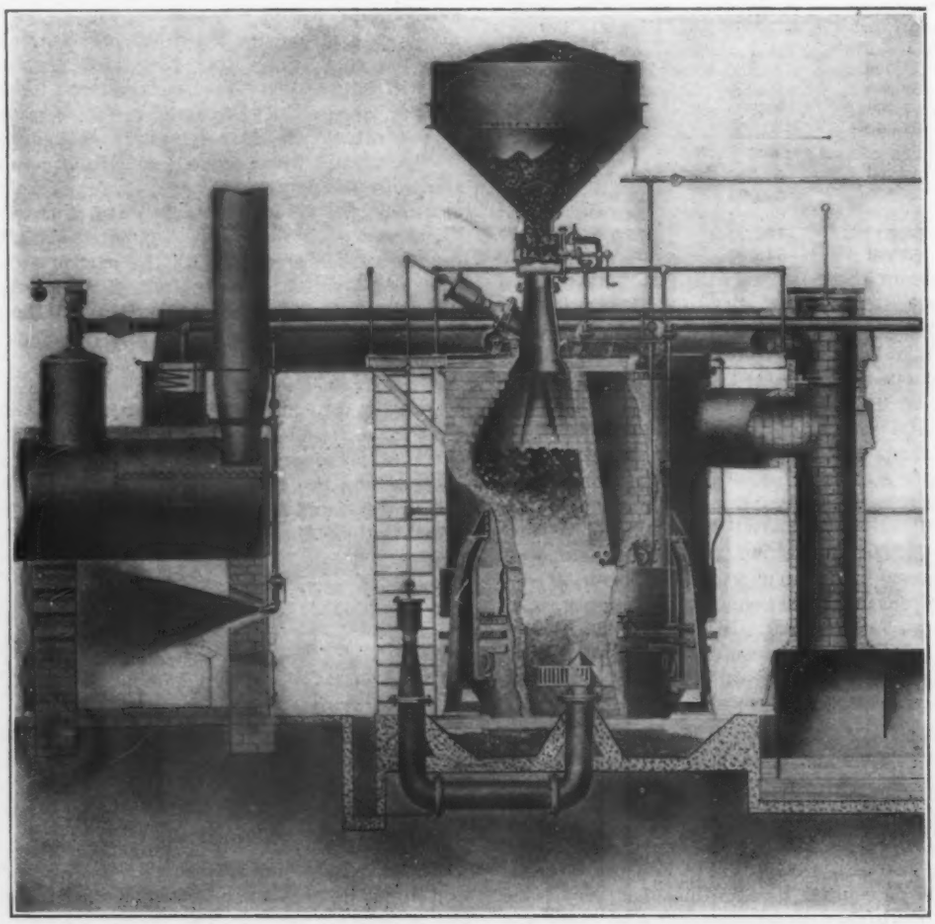


Fig. 1.—One-Half of the Hill Bituminous Gas Producer Plant, Showing the Generator, Down-Comer and a Boiler Arranged to Be Fired with the Tar By-Product and Surplus Gas.

The revolving lower section of the shell keeps the fire constantly stirred, breaks up cinders and prevents clinkers forming, and the ashes are forced out through the water in the seal.

From the generator the gases pass to

The Down-Comer.

The down-comer is made of ¼-in. steel, and is lined with 3-in. fire brick. The bottom rests in a water seal and consists of a cast iron box with a projecting arm, so that when the plant is not running water is admitted, which provides a seal or a valve, shutting off the scrubber from the generator. At the top of the down-comer a mushroom valve, provided with a saucer valve cap, is placed so that by raising this valve to the purge stack connections are made. Very often, instead of allowing the gases to escape through the purge stack, they

are piped to a boiler and burned under it. This applies to plants where it is necessary to keep up steam pressure for operating fire pumps at night and Sundays, and at the same time allows the fire in the generator to be kept at a proper hight. From the down-comer the gases are conducted to the scrubber, Fig. 2, where the gas is brought in contact with the water, which is admitted in the top through a series of sprinklers.

The Scrubber.

The scrubber consists of a steel shell, made of ¼-in. sheet steel properly calked and provided with a canopy hood at the bottom and water sprinklers at the top. Three clean-out doors are located at different hights, and the scrubber is set in a water sealed pit, the bottom of which is pitched toward the tar collecting tank. Connections from the top of the scrubber to rotary washers are made of standard wrought iron pipe, and fittings are arranged with clean-out doors, so that any deposit of tar could be easily removed.

The Tar Tank.

Between the wet scrubber and the rotary washer a tar collecting tank is provided. Through the drain from the water sealed pits of the scrubber and washer, connections are made so that the tar is collected in a vertical tank with conical top and valve. A steam coil for heating the tar is provided, so that by closing the valve at the top of the tar tank and admitting live steam the tar is forced from the collecting tank to the tar storage tank mounted above the boiler, as shown in Fig. 1.

The Boiler.

The tar storage tank on top of the boiler is provided with a steam heating coil and the tar is fed by gravity to the tar burner, where under steam pressure it is atomized and burned for firing the boiler. The boiler is also provided with a set of grate bars, so that the plant may be started firing the boiler with coal. In such places where steam pressure must be maintained at all times for fire protection, &c., a connection is provided, so that the purge gases from the producer at night and Sunday are carried to the boiler, and burned under it.

The gas leaves the scrubber cooled, and is conducted to the rotary washer through a wrought iron pipe. The fittings are tees, with one side blank, so that they can be easily removed for inspection and cleaning.

The Rotary Washer.

The gas from the generator is practically cleaned before leaving the producer, but to insure satisfactory operation the rotary washer is furnished with each clean gas plant. This washer is of the three-stage type, consisting of three rotary wheels and three stationary compartments, each compartment being provided with three sets of stationary cast iron rings, and with water legs or drains so that the water, tar and soot are drained in the pit below the washer. The gas is admitted through a pipe, sealed at the base with water and connected to the center set of wheels in the washer, at which point there is a partial suction. At this point water is sprayed upon the wheel and the gas and water are forced through the stationary iron rings which breaks up the water into a fine mist and allows the gas to expand. At the top of this section a second set of wheels picks up the gases and water is admitted, so that the water and gas is again forced through the stationary deflecting iron rings and allowed to expand before being forced through the third section of rotating wheels. The gas is then delivered under pressure to the dry scrubber. This pressure is maintained constant by a regulator mounted over the washer and operating on a governor attached to the turbine or electric motor driving the washer.

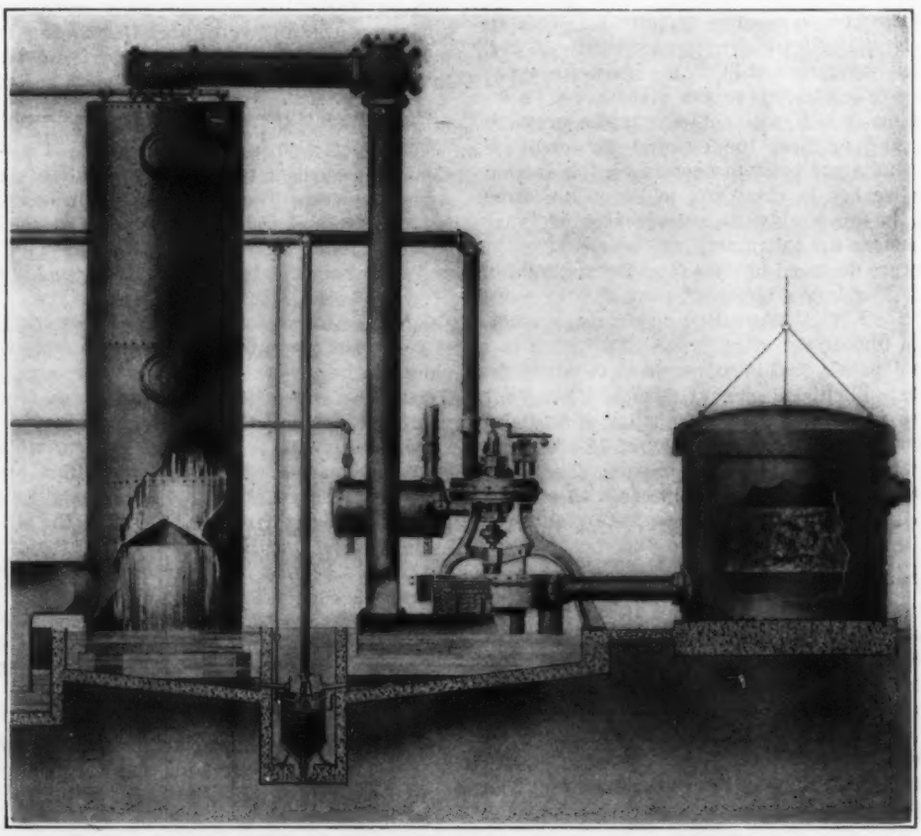


Fig. 2.—The Other Half of the Hill Bituminous Gas Producer Plant, Showing the Wet Scrubber, Tar Tank, Rotary Washer and Dry Scrubber.

The governor on the turbine maintains a constant speed at any point between the minimum speed required to clean the gas and the maximum speed at which the turbine is designed to operate. An adjustable weight is attached to the top of the regulator, so that any pressure desired from 3 to 12 in. water gauge can be maintained on the gas mains. The steam from the turbine is exhausted into a receiving tank provided with a bypass and reducing valve, and the exhausted steam is piped to the induction blowers on the producer and is used for gas making. As the load on the turbine increases the back pressure and quantity of steam increases, thereby increasing the steam and air pressure on the producer. The speed of the steam turbine increases or decreases with the load, and as this turbine also drives the shaft operating the generator and feed, the amount of fuel admitted to the producer is in direct proportion to the amount of gas being made.

The plant is automatic and can be adjusted to any

load. The three principal features governing the operation of the plant are accomplished automatically and mechanically, viz., the feeding of coal, the rotation of the producer and the adjustment of air and steam. This, it is claimed, insures a uniform quality of gas at all times and the highest economy in operation, as the plant only makes gas in proportion to the load.

The Dry Scrubber

The dry scrubber consists of a circular tank, made of ¼-in. steel and provided with two perforated plates, between which there is a filling of excelsior, which has been saturated with oil, so that the gas in passing through this excelsior will deposit any particles of soot, dust or similar foreign substance on the excelsior. To facilitate easy excess to the dry scrubber a water sealed top is provided, which is raised or lowered by a block and chain. The bottom of the dry scrubber is provided with a drain, so that any condensation is piped to the sewer. For such plants the company's standard cast iron economizer is used, with an automatic water regulator such as furnished with the company's anthracite plants. This economizer generates the necessary steam and also preheats the air. The economizer is provided with an automatic regulator, insuring a uniform quality of gas.

The plant as above described is the pressure type; however, there are places where the plant must be installed in buildings which will not permit the pressure type producer, and to meet the demand for such apparatus, these plants are built to operate on the suction principle. The washer in this case, while of the same general design, is provided with a larger set of inner wheels, which act as an exhauster.

These plants are designed in sizes from 200 to 2000 hp. in single units. For larger size equipment two or more generators are used. The one cooling apparatus, washer, &c., is sufficient, for, unlike other types, the washer can be operated continuously and is so simple in construction that there is little likelihood of shut downs. This plant as a whole when operating on a good quality of bituminous coal is reported to have an efficiency of 75 per cent., which includes all the auxiliary apparatus. The company is prepared to furnish these producers with engines and electrical equipments, making a complete plant.

Lake Ore Shipments to November 1.

The movement of Lake Superior ore by water in October was 6,625,801 gross tons, as against 7,050,985 tons in September. The smaller shipments in October, though it was a 31-day month, were due to storms, which to an unusual extent tied up the fleet. The total shipments for the season to November 1 were 36,265,334 tons, against 21,730,072 tons to November 1, 1908. The figures for October and for the season to November 1 are as follows, with comparison with 1908:

	October, 1909.	October, 1908.	To Nov. 1, 1909.	To Nov. 1, 1908.
Escanaba	928,175	739,924	4,930,971	2,746,116
Marquette	528,195	306,622	2,507,712	1,177,730
Ashland	714,271	498,802	3,136,275	2,019,948
Superior	1,003,956	644,175	5,747,454	2,908,619
Duluth	2,002,861	1,730,447	11,850,038	7,931,568
Two Harbors	1,448,343	1,179,140	8,092,884	4,946,091
Totals	6,625,801	5,099,110	36,265,334	21,730,072

To equal the record of 1907, shipments after November 1 this year will need to be 5,023,421 tons. Unless extraordinary weather conditions should prevail—a continued run of storms or an unusually early freezing up—there seems no obstacle to equaling or exceeding the shipments of 1907. It is to be remembered that while 42,245,070 tons was the record of shipments in 1907, 956,315 tons of this amount went by all-rail routes. In view of the remarkable demand for ore this year it may be that this all-rail record will be exceeded, though it is to be considered that the present scale of demand did not develop until the navigation season was well advanced.

The American Car & Foundry Company, Detroit, Mich., is letting contracts for the erection of a one-story addition to its plant, 60 x 1000 ft., to cost $60,000.

Carborundum and Carborundum Products Used in the Foundry.*

BY A. G. RODGERS.†

Ever since the discovery of carborundum by Edward G. Acheson in 1891 there have constantly arisen new fields for this useful and interesting material. Its extreme hardness and sharpness make it an ideal abrasive. Its refractibility and infusibility make it an ideal material for the lining of furnaces subjected to intense heat. Being a powerful deoxidizing agent, it is an ideal material in the manufacture of steel, increasing the fluidity and temperature to a marked degree. The uses of carborundum are so numerous that it would be impracticable to enumerate them here, but the three I have already referred to are of especial interest to the foundryman. Before taking up the commercial side of carborundum I will give you a brief outline of its manufacture.

Carborundum is a product of the electric furnace, formed at a temperature of about 6000 degrees F. It is derived from two of the most refractory materials known, carbon and silica, and if it were possible to combine all the valuable qualities of these two substances in one, the result would be an almost perfect refractory.

Description of the Process Employed.

The electric furnace employed by the Carborundum Company consists of a long troughlike structure lined with firebrick. The ends of the furnace have built-in carbon terminal rods, to which are attached the cables conveying the electric current. The mixture of sand and coke is placed in the furnace around a so-called core of ground coke. This core completes the circuit between the terminals and offers a path of very high resistance to the electric current; the resistance thus interposed results in the generation of enormous quantities of heat. After the furnace has been run for a few hours there can be seen at all the joints and on top of the mixture small blue flames of oxide of carbon, which have been produced by the reaction of the silica by part of the carbon. This reaction is immediately followed by the one which forms carborundum, since the silicon combines as it is formed with the excess of carbon.

A cross section of a carborundum furnace after the reaction is complete presents an interesting and beautiful appearance. The original core of ground coke is found to be very different in its characteristics; the high temperature to which it has been raised has driven off all impurities, leaving nothing but pure carbon either in the amorphous or graphitic forms. From the core radiate beautifully colored carborundum crystals; at a distance of about 12 in. the crystals suddenly cease and instead is found a thin layer, about 2 in. in thickness, of a light green color, which is the inner crust of amorphous carborundum or so-called "firesand." Beyond this is the No. 2 crust, into which most of the impurities have been driven. Surrounding this and extending to the furnace walls is unchanged mixture.

Abrasive Wheels and Stones.

The crystalized carborundum having been ground, washed and graded into the different sizes, is then ready to be made into grinding wheels, rub stones, sharpening stones, &c., of thousands of different sizes and shapes to meet the requirements of practically every branch of manufacture.

Although the operation of abrasive wheels in the foundry seems a very simple problem, it nevertheless presents many interesting and complex sides. Choosing the proper abrasive of the right grit and grade to show the most efficient results on the material to be ground has taken years of study and experimenting both on the part of the foundryman and the manufacturer. In this wide field carborundum has proved itself a most important factor, showing its superiority in almost every branch over all other kinds of abrasives.

For a long time the Carborundum Company has real-

* Read before the Philadelphia Foundrymen's Association, November 3.

† Of the Carborundum Company, Niagara Falls, N. Y.

ized that the grinding of all classes of steel was a study in itself and that carborundum did not always meet with the same success in this branch as in some others. The failure of carborundum to meet some of the requirements of steel manufacturers and machinery builders led F. J. Tone, works manager of the Carborundum Company, to experiment with and develop another electric furnace product, which he has called aloxite.

Aloxite.

Aloxite has a somewhat different chemical composition from carborundum, and although not as hard is much tougher. This material has got beyond the experimental stage, and from numerous reports of tests received by the Carborundum Company bids fair to take the place of all other abrasive materials in this very important field.

I will cite one case in particular that I personally witnessed; it being one of the first tests made of aloxite, was doubly gratifying in its results. At the plant of a large manufacturer of railroad frogs, switches, &c., the aloxite wheel was tried out in competition with several other wheels of well-known makes on manganese steel frogs. This wheel ground one frog in 5 hours against 8½ hours for the best competitive wheel. Another aloxite wheel of a harder grade and coarser grit was tested on this same work and the results were still more surprising, for this wheel beat out the first one about 50 per cent. Needless to say, the company was very much pleased with this showing and is using the wheels exclusively on this work to-day. One point which struck me very forcibly in this test was the apparent ease with which the operator swung his grinder; the wheel seemed to almost feed in itself and took hold of the material with a clear businesslike sound, unlike the others that needed considerable pressure to make them cut at all.

I have referred to this particular test to show you what was accomplished with this material in its experimental stage. To-day we know a lot more about it and are able to produce wheels of uniform grades, adaptable to the work to be ground. High speed tool steels, which have always been a severe test to abrasive wheels, are easily cut and ground, both wet and dry, with no undue heating with aloxite wheels.

Carborundum Firesand.

Carborundum firesand has many valuable characteristics. Among its physical properties it may be noted that it has a specific gravity of 2.7, is of a grayish-green color, granular and easily crushed. Chemically, it is classed with the so-called silico-carbides, which are compounds of carbon and silicon with or without oxygen. In an oxidizing atmosphere it slowly undergoes a surface oxidization.

Carborundum firesand is of special interest to the foundryman on account of its wide use in the construction of brass melting furnaces. With the introduction of fuel oil and gas fired melting furnaces new conditions were encountered which the various refractory materials heretofore employed could not meet. Certain portions of the lining were subjected to very high temperatures, under which ordinary firebrick or even magnesite or chromite linings entirely failed. The most exacting conditions, however, in the matter of resistance to the high temperature of the oil flame and the scouring action of copper and brass slags are met by the use of carborundum firesand. Mixed with the proper binding materials, the entire lining may be rammed up in a solid block, having no joints and presenting a smooth, glazed surface of high refractivity and good mechanical strength. For this purpose silicate of soda is the binder most commonly used. When thoroughly incorporated the constituents form a plastic mixture which is easily molded and has a sufficient cohesion when tamped into place to retain its shape until fired. A center of iron or wood is provided, the dimensions of which conform to the shape required for the interior of the furnace. The firesand mixture is rammed solidly between the center and the iron shell of the furnace, and after the removal of the center the lining is dried out with a slow wood fire. By bringing the furnace slowly up to heat, it can be at once put into service.

This method of molding the entire lining into place has many advantages, the most important being that it avoids the weak feature of joints. The joints are undoubtedly the weakest part in any furnace lining built of firebrick. When made with the greatest possible care they always present to the flames space where the volatile fluxes can lodge and where the slag can scour its way between the brick, with the ultimate result that the bricks are loosened and the lining destroyed. However, by molding the lining in place in a solid mass no costly shaped bricks are required, and it is possible to retain the irregular curved surfaces which are needed for the proper deflection of the flame and for the openings of the furnace.

Molds for Cooling Aluminum.

The very remarkable thermal conductivity of carborundum has recently received an interesting application in the manufacture of molds for cooling aluminum, to rapidly chill the cast metal. Aluminum, as moreover all other metals, becomes much denser when it is cast in a carborundum mold, which rapidly extracts heat from the cast metal. By this there is produced a sort of temper which gives the metal a much finer and denser structure. Sand molds, on the other hand, being poor conductors of heat, cool the metal very slowly and in consequence allow all the constituents of the metal the time necessary for crystalization and segregation.

The manufacture of these molds consists, according to the inventor of the process, in dry mixing fine carborundum powder with sugar and clay. The mixture is moistened with sufficient mortar to give a plastic mass to which is given the shape of the desired mold; this is then baked. These molds also possess the advantage of being much lighter than metallic molds, and of being readily broken, crushed, reduced to a fine powder and reagglomerated again with a different shape.

To conclude what has been said regarding the action of heat on carborundum, I would add that it is completely infusible at the very highest temperatures, but that it suddenly decomposes into its two constituents, one solid, the other gaseous, when the power of the source of heat has become very large, without, however, passing into the liquid state.

Other Carborundum Products.

Carbide of silicon, its purpose and use in steel, was very intelligently treated by F. J. Tone, printed in *The Iron Age* of June 22, 1899. You are all probably more or less familiar with its use, and I do not think I can tell you anything new regarding it. The continued increase in sales in both this and foreign countries is its best advertisement.

Silicon metal is still another electric furnace product produced at the plant of the Carborundum Company. Ten years ago metallic silicon or silicon metal was a comparatively rare substance and was classed as a laboratory curiosity; by the close study of the science of its manufacture and by use of the electric furnace, the Carborundum Company has placed it among the commercial metals and made it available for practical use. Its chief use is in the refining of steel, and it is of practical economy to the foundryman and steel maker in that it produces quicker and better results in making dense castings. An analysis of the 90 per cent., or most popular, grade of silicon metals is as follows:

	Per cent.		Per cent.
Silicon	90.60	Phosphorus	0.02
Iron	6.70	Carbon	0.22
Manganese	0.08	Sulphur	0.00
Aluminum	2.35		

From this analysis it will be noted there is an entire absence of the highly objectionable impurity sulphur, and it contains over 2 per cent. of aluminum, which is a powerful deoxidizing agent. Although used principally by steel makers, it is destined to have a large field when alloyed with other metals.

Nicholson & Co., Rankin, Pa., operating the Pittsburgh Chain Works, report an improvement in the demand for hand made chains; their mine car hitchings and forging department is also being operated to greater capacity.

Electro-Cementizing.*

A Process for Simultaneously Annealing, Cleaning and Zinc-Coating Wire.

BY ALFRED SANG.

Iron or steel wire for fencing, barb wire and wire goods of various kinds is usually zinc coated by the following method:

The wire is drawn successively through, first, a tubular annealing furnace of considerable length; second, a solution of hydrochloric acid, which removes scale and the carbon left by the burning of traces of wire drawing grease; third, chloride of zinc, or else a mixture of sal-ammoniac and glycerine floating on the surface of, fourth, a bath of molten zinc at a temperature of about 500 degrees C., and, fifth, wipers (made of asbestos pads pressed together by vertical screws), and thence through water to the take-up frame.

These five operations of annealing, cleaning, fluxing, coating and wiping must be controlled within definite limits; any single one of the many possible errors of manufacture will affect the quality of the product.

The drawbacks inherent to the hot process as applied to wire are five in number: First, the annealing is imperfect; second, the acid bath causes the absorption of hydrogen, which not only hardens the surface, but promotes subsequent corrosion and prevents the intimate adherence or alloying of the zinc to the iron; third, the flux causes pockets to form between the zinc and the iron, in which traces of chlorides are imprisoned and assist corrosion while the wiping destroys the pockets themselves, leaving areas where the coating is practically nonadherent; fourth, the zinc deposited is high in iron and therefore more readily scaled off than pure zinc and sooner destroyed by moist air and other agencies; fifth, the wiping is difficult to control; if too close it will very often cause streakiness, the protection to the iron being that afforded by the amount of zinc at the thinnest spots; if the zinc is wiped too cold there occurs a transversal crackling not unlike the hair cracks in a troweled surface.

The hot process is not a simple one, and an expert wire galvanizer is a valuable specialist; it only appears simple and advantageous as compared with more recent processes, because there are two generations of experience back of it.

The interest recently shown by the United States Department of Agriculture, and the investigations which are being also carried out by leading wire manufacturers, indicate that there is a demand from farmers and others for something better than the present grade of galvanized wire. In the hope of helping the question and of drawing attention to what is probably a new field of experiment I submit the following described patented process, which has been tested in a modest way and, it is hoped, will soon be tried, for a verdict of life or death, on a small commercial scale.

The claims to attention possessed by this process are its comparative simplicity, the fact that it lends itself to scientific control, and the quality of the product. I seriously doubt if it can equal the low costs for hot galvanizing under conditions as they now exist, unless it be applied on a very large scale.

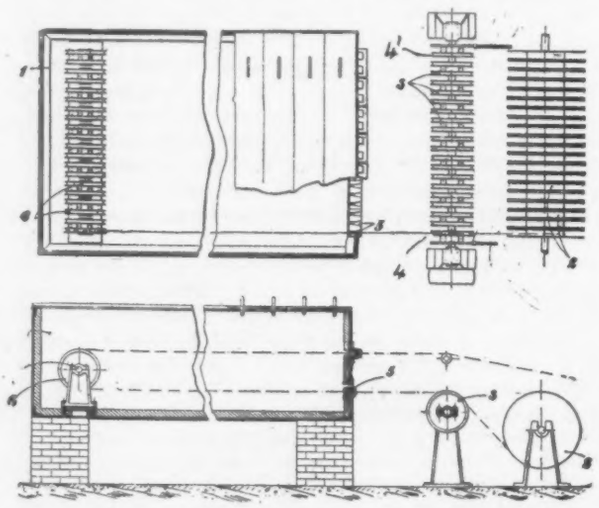
Electro-Cementizing Apparatus Described.

The principle involved in this new process, which I have called "electro-cementizing"—cementizing being the process of depositing metals by cementation, of which sherardizing is a form—is by no means new. We find in the *Bulletin de la Société de Chimie et de Physique* for the year 1865, page 374, that M. Dumas has found a means of zinc coating iron by burying it in oxide of zinc and powdered charcoal and heating it to redness. Since then many processes depending on the reduction of oxides or oxidized dusts in contact with the articles to be coated have been tried, usually with indifferent success.

The novelty of electro-cementizing consists in the method of heating by electricity, the heat being directly applied to the articles by using them as resistances. On the very face of it, it is only applicable in practice to articles of small cross section, such as wires and strips, although in theory it may be applicable to larger goods, and if carried out on a very important scale could undoubtedly be applied to thin sheets and tubes.

Referring to the accompanying diagram: The coating chamber or furnace (1) is built of iron plates and lined with refractory material as used in zinc smelting furnaces; it is filled from the top with a mixture of crushed coal and oxide of zinc. The wire comes off the reels (2) and passes over and around brass contact sheaves (3), which are equal in number to the strands of wire which the furnace will treat at one time and are mounted tight on a common shaft from which they are insulated by nonconducting bushings. This shaft, by revolving, leads the wires and relieves the tension on them. The single sheaves at each end of the shaft (4, 4') are connected through the proper rheostat to the poles of a suitable transformer supplying alternating current at a low tension, which may be varied within certain limits. The intermediate sheaves are paired by means of common hubs so that the current may pass freely from one to the other in each pair.

The wires now pass between the hinged aprons or



Plan and Vertical Section of the Alfred Sang Electro-Cementizing Furnace.

flaps (5) and into the lower part of the furnace, then over another series of sheaves (6) inside and at the rear end of the furnace, these sheaves being similar in every respect to the double sheaves on the outside, but staggered in relation to them, by which is meant that the near sheave of each outside pair is in line with the far sheave of each inside pair; the wires then return through the upper part of the furnace and through a second set of hinged flaps, to the take-up frame, which would, if shown in the drawing, stand to the right of the paying-out reels. The valuable idea of bringing the wire back through the upper part of the furnace was suggested to me by Mr. Hadaway of the Westinghouse Electric & Mfg. Company.

The entrance and exit flaps will allow the passage of the loops which connect successive strands end to end; the material falling through these openings will be collected and fed back to the furnace.

When all the strands of wire are in place and connected, therefore, in series, the current will pass zig-zagwise in and out of the furnace and a wire resistance of considerable length will thus be afforded. The entire system forms a resistance grid on a very large scale.

As the heating up is necessarily rapid and as no useful purpose can be served by maintaining the full temperature once it has permeated the wire, it is probable that a very short furnace will suffice, in which case it would be necessary to alter the design of the plant in order to afford the wire a sufficient length of time to cool in a nonconducting medium and out of reach of the

* A paper presented at the meeting of the American Electrochemical Society in New York City, October 28-30, 1909.

air. As it leaves the furnace the wire might be led to the take-up reels through tubes, in order to prevent chilling.

If for any reason a wire breaks or pulls out the simplest thing to do is to cut it out entirely and connect up the sheaves between which it ran by a copper conductor or a standard resistance on the outside, until such time as the furnace is closed down for cleaning, inspecting or repairing.

The Operation in Detail.

The details of the operation may be described as follows: The wire is quickly brought to a bright cherry-red, at which temperature all grease is volatilized, scale or rust is reduced by the carbon and occluded gases are driven out; at the same time the zinc oxide in immediate contact is reduced and, as vapor, soaks into the "pores" of the metal, which are well opened by the heating, and condenses on the surface as the heat drops. As the wire returns through the upper part of the furnace it cools down slowly from a temperature considerably above its recalescence point, so that it is annealed. With low carbon steels an excess temperature of annealing of 200 or 300 degrees is not likely to affect seriously the quality of the wire. The coating is of the color of freshly electro-deposited silver. The quality of the product is mostly due to the alloy of zinc and iron; as I have pointed out elsewhere, iron which has absorbed an almost infinitesimal amount of zinc by being exposed to zinc vapor in a reducing atmosphere is most difficult to corrode and resists a solution of hydrochloric acid in a most remarkable manner.

The oxide and finely divided carbon form a nonconducting mass, and the heat emanating from the wires will accumulate in the furnace until a constant temperature, not far below the reduction point of the oxide, will be reached; this will greatly reduce the amount of current required to operate the process. After the operation is under way the resistance of the hot wires will be much greater than that of the cold wires.

Most of the time consumed in sherardizing is spent in forcing the heat from the outside through a nonconducting mass of zinc dust; in the meantime most of the heat units go up the flue. The thermal efficiency of electro-cementizing is better and will go far toward balancing the excessive cost of electric heat.

The New Process Combines Several Operations in One.

It appears, therefore, that the new process would combine in itself the annealing furnace, the cleaning process and the zinc bath and do away entirely with the fluxing and wiping. While the cost of the heating will surely exceed that of the hot process, at least until the furnace has reached its constant temperature, the costs of installation, maintenance and depreciation, taken in one with the other, will probably be lower than for the hot plant; the cost of the zinc will be much less, standing at about 3½ cents on a 5-cent spelter market, with less waste, and the labor cost should be little, if at all, in excess of what it is at present; the wire will run more slowly, but there will be a compensating increase in the number of strands.

A serious objection has been offered with regard to the temperature of the wire. The estimated maximum temperature of 900 degrees C. is high, and there is undoubtedly danger of the wire breaking inside of the furnace, or at least being elongated; most galvanized wires are of small gauge, No. 12, for instance, being a very important size. The driving of the contact sheaves is calculated to relieve the tension created by the take-up reels and breakage from sag need hardly be feared and could easily be prevented. However, the criticism is a very legitimate one; trial on a commercial scale will reveal the problem, if it exists, and it can then be attacked and, I believe, successfully solved. The mechanical and electrical elements of the process are by no means complicated, and the most valuable criticisms and hints will come from those who know, from their experience with zinc reduction furnaces, what is likely to take place inside the coating chamber.

Other Oxides Than Zinc May Be Used.

Oxides of other metals besides zinc may be used. Zinc dust, with which I carried out my first test, deposits zinc at a much lower temperature, and might be useful for wire which must not be annealed, but its use is open to many serious objections. It is costly, and by aging it becomes in part converted into the carbonate of zinc, which requires a higher temperature of reduction at which, unfortunately, carbon dioxide begins to act and, unless special precautions be taken to maintain an atmosphere rich in carbon monoxide, the result is a gray coating of mixed zinc and zinc carbonate which suffers further decomposition, until, after a few months, it crumbles when the articles are hammered or bent. All dark colored sherardizing is more or less in this condition, and the sulphate of copper test, to which inspectors cling as to a fetish, is worthless as a test quality, its limited value being in connection with coatings of zinc and not of zinc carbonate. Again, the use of zinc dust requires an air tight furnace, which in itself would suffice to make the process uncommercial.

Zinc oxide, on the other hand, having a zinc content of 80 per cent., is an intermediate product in the manufacture of spelter, does not require an air tight furnace, is not injurious to the workers, like zinc dust, and does not deteriorate, nor, on account of absorption of hydrogen from moisture, call for restrictions, in respect to its storage, by fire insurance companies. Most important of all, its reduction yields a coating of pure distilled zinc which is thoroughly alloyed to the metal underneath.

Canadian Car Builders Merge Their Interests.

Announcement is made that the Pressed Steel Car Company has withdrawn from the Canadian field by the sale of its plant at Montreal operated by the Canada Car Company, Ltd. This concern, which the Pressed Steel Car Company controlled through stock ownership, has a capacity of 6000 freight cars and 150 steel passenger cars a year, and in the last annual report of the holding company attention was called to the fact that while the American plants were practically at a standstill for the greater part of the time the Montreal plant had been in operation during the entire year, helped out by the orders of Government supervised Canadian roads. It is capitalized at $3,000,000, of which $1,000,000 is 7 per cent. cumulative preferred stock.

The purchase price, it is stated, was $1,700,000 in cash, no interest being retained in the company or in the merger of Canadian car manufacturing companies which effected the purchase. The common stock of the Canadian company was carried by the Pressed Steel Car Company without valuation. Dividends on the preferred were begun in December last year, when a full 7 per cent. was paid. The plant was put in operation in the fall of 1905.

The purchasers are about to incorporate the Canadian Car & Foundry Company, which will have a capitalization of $5,000,000 7 per cent. preferred stock and $3,500,000 common stock and $3,500,000 6 per cent. bonds. It will be a consolidation of the Canada Car Company, the Dominion Car & Foundry Company and the Rhodes-Curry Company. The Dominion Car & Foundry Company has a capitalization of $3,510,000 common stock and the Rhodes-Curry Company $1,850,000 preferred and $1,000,000 common stock. The stockholders of the two last named companies are to receive securities in the new company in exchange for their stock.

The directors so far selected for the new company are as follows: N. Curry, W. W. Butler, N. S. Reeder, James Redmond, Z. A. Lash, T. J. Drummond, W. M. Aitken and Wm. McMaster. They have chosen the following officers: N. Curry, president; W. W. Butler, first vice-president, in charge of sales; N. S. Reeder, second vice-president, in charge of operation; J. A. Skelton, secretary-treasurer, in charge of accounting; A. H. Chave, purchasing agent. All of the officials have been connected with the different plants merged for a number of years. The general offices will be at Montreal.

James A. Reid, warden of the Indiana State Prison at Michigan City, Ind., has been instructed to inquire into the feasibility of introducing the manufacture of agricultural implements by prison labor.

THE NATIONAL FOUNDERS' ASSOCIATION.

The Proceedings of the Thirteenth Annual Convention.

Much more cheerful reports concerning the foundry trade were given by attendants at the convention of the National Founders' Association, at Hotel Astor, New York, Tuesday, Nov. 9, than were brought to the convention of one year previous. Malleable foundries in particular were reported as exceedingly busy; next to them come steel foundries, especially those of the East. Jobbing foundries, it was admitted, are coming at a more moderate pace into full employment.

Following the custom of other years, the administrative council of the association met in advance of the convention, Monday being given up to its sessions. On Monday evening was held the "alumni" banquet, attended by 29 members and ex-members of the council and by the officers of the association. J. H. Schwacke, of Wm. Sellers & Co., Inc., Philadelphia, presided over the speechmaking. A very pleasant feature was the presentation to the retiring president, Henry A. Carpenter, Providence, R. I., of a magnificent loving cup. Edgar McDougall, Montreal, Que., spoke for the donors. Other speakers of the evening were Stanley G. Flagg, Jr., Philadelphia; C. Bermingham, Kingston, Ont.; Isaac W. Frank, Pittsburgh; Antonio C. Pessano, Detroit; O. P. Briggs, Minneapolis; J. L. Ketcham, Indianapolis, Ind.; H. Cockshutt, Brantford, Ont., and G. E. Emmons, Schenectady, N. Y.

About 125 members of the association were present at the opening of the convention Tuesday morning. President Carpenter announced the following committees:

Resolutions.—T. L. Richmond, Buffalo Scale Company, Buffalo, N. Y.; F. B. Farnsworth, McLagon Foundry Company, New Haven, Conn.; W. S. Hallowell, Harrison Safety Boiler Works, Philadelphia.

Finance.—G. E. Emmons, General Electric Company, Schenectady, N. Y.; O. P. Letchworth, Pratt & Letchworth Company, Buffalo, N. Y.; H. Woodland, Allis-Chalmers Company, Milwaukee.

Press.—O. P. Briggs, Minneapolis; C. Bermingham, Canadian Locomotive Company, Ltd., Kingston, Ont.; H. D. Miles, Buffalo Foundry & Machine Company, Buffalo; Marshall Cushing, New York.

President's Address.

At the outset President Carpenter said that the past year had been one of unusual quiet in association affairs. Nevertheless the experiences of the year had impressed on him the conviction that the management of such an institution requires constant and undivided attention. The policy adopted by the convention of 1904, he said, had successfully stood the test of the most trying years of the organization and he recommended its continuance. Taking as a text the first object of the association—"the adoption of a uniform basis for just and equitable dealings between the members and their employees, whereby the interests of both will be properly protected"—the speaker said:

Responsibility of Employers.

The responsibilities placed upon us as an association of manufacturers are manifold. As we do well or ill depends the future of our business and the welfare of our employees. I wish it were possible for this body to devise ways and means to eliminate the necessity for defensive action on our part and at the same time secure fair treatment alike for molder and foundryman. But defense associations among employers are essential, as well as unions among employees, when properly constituted, and we must not for a moment console ourselves with an imaginary security, because we have lately been blessed by a period of quiet and freedom from union demands, either just or unjust; neither must we gain the erroneous opinion that the trade union with which in the past we have so frequently locked horns is on the verge of disruption. The history of unions tells us that they do not frequently disband altogether or go out of existence. They experience periods of prosperity and depression, but also possess a remarkable recuperative power, which is always coincident with an improvement in the general business conditions.

Not until both employer and employee refrain universally from arbitrary or tyrannous interference with the rights of each other will anything like ideal conditions be established. Organizations of employers, such as ours, as well as organizations of labor, such as that of the iron molders, should bear in mind that the interests of their constituents are dependent in a great measure one upon the other. But I believe these interests will never be solidified until the union shall have purged itself of its present lawless methods and shown an inclination to depend more upon frank, open, straightforward tactics, not only in its interior management, but in its dealings with the employer.

The history of our association and our efforts at conciliation are now a matter of common knowledge, but in no sense may the failure to harmonize the interests of our members and that portion of their employees belonging to the molders' union be charged to any lack of work or energetic effort on the part of those who were instrumental in the undertaking. For seven years these persistent and consistent efforts to negotiate with the union iron molders through the medium of their organization continued, and approximately 2500 conferences were held in which officers of the union were given a liberal hearing. But the union continued to force its obnoxious conditions upon the proprietors and brought its campaign of attempted extinction of the open shop foundry to a close by inaugurating, in May, 1906, the most extensive strike known to the history of the industry.

Upon several occasions the remark has been made by those who naturally were uninformed that in this strike of 1906 "the National Founders' Association sought war and got it," and my main purpose in rehearsing this history is to deny the above assertion in as emphatic words as the English language will permit. Not only do I feel it my duty to deny the truth of the assertion that the National Founders' Association sought war and got it in 1906, or any other year, but I believe the fact should be made public at this time that the officers of this association were in possession of positive evidence prior to the beginning of this strike that the campaign of the Iron Molders' Union, as outlined by its Executive Board in April, 1906, contemplated the deliberate bringing about of just such a strike as actually took place, to the end that the forces of our association might be torn asunder and weakened. I make this statement with a full knowledge of the responsibilities devolving upon me, and shall merely add that it is based upon documents prepared by the union itself. It is my great regret that the advocates of the trade agreement, of conciliation, of every form of union recognition, were not thoroughly posted as to the initial details of this monumental molders' strike of 1906. Until you, as members of the association, issue your orders for the spreading of this gospel, you will leave undone a service to mankind. The issuance of a comprehensive statement of this character would do more than is possible in any other way to show how the attempt properly to care for the interests of the union iron molders in the employ of our members not only failed, but resulted in bitter feeling and the final abrogation of the working agreement, solely because of the dictatory and arbitrary position assumed by the officials of the union.

Relations to Employees.

The open shop policy of the association, which has been in effect so successfully for the past five years, the address continued, is that recommended by the Anthracite Strike Commission. In interpreting the expression "a fair day's pay for a fair day's work," the president said:

The term "fair day's pay" requires a different interpretation from that of a few years ago. For several years we have been confronted with a shortage in the supply of competent iron molders. Not only has this condition been with us in times of war, but likewise in times of peace. If foundry proprietors will not do their share in the education of this supply the natural sequence will be the curtailment of product. It is manifestly unreasonable to expect an employers' association to furnish skilled workmen when the employers themselves have failed to educate them.

Our association has attempted to keep this foundry labor supply topic prominently before the members, and a great deal has been accomplished in many shops, although some have been content to let the other fellow do the educating and they will do the using. But the nonmember of the asso-

ciation has not always been the recipient of our literature; as a consequence he is not abreast of the times, does not know what the demand for help really amounts to and is not doing what he should to assist in providing for the future of the foundry in the matter of labor. Members of our association should not permit this condition to continue uninterruptedly. Either these firms should be brought into the fold where they may be educated for the general good or some other means adopted to impress upon them the necessity of putting a shoulder to the wheel.

The subjects of the "fair day's pay for the fair day's work" and the supply of foundry labor cannot well be dodged by the foundry proprietor. Foundrymen have been known to advance wages voluntarily, although there is a possibility that this has not occurred as frequently as should have been the case. As an association, I do not believe we could in fairness to our members decide upon an equitable or a universal wage advance; but in my opinion we as an organization of employers would have much less friction, and there would be less trouble in the foundries of individual employers, if in prosperous times wages were voluntarily adjusted to services received and the advances in the cost of articles necessary to maintain a home and family in a decent, respectable, healthy and comfortable manner. Furthermore, there is a distinct advantage to the foundry proprietor or other manufacturer who adjusts his wages voluntarily and without awaiting the receipt of "demands" from a labor union or committee of his employees.

In my opinion many strikes are forced upon employers because of delays in the adjustment of wages or other conditions of employment about the factory. These adjustments do not contemplate changes which the employer might be averse to making; but he delays them until the union or his workmen get together and demand the change, and then he is compelled to concede, conciliate or fight. A constant watchfulness by the employer, a readiness to anticipate possible requests for changes which he can afford to install, would render unnecessary the presentation of demands of employees, which have occasionally come to my notice, and at the same time knock the props from under one of the greatest elements in the building up of the labor union. This would also relieve the employer of the humiliation of conceding a "demand," which he knows to be just and in which he would have acquiesced had his attention been directed to it by his employees without the use of the word "demand," a term calculated at all times to inspire a spirit of defiance in the heart of the one to whom it is addressed.

I should not wish by the foregoing to be understood as attempting to commit this association to a new line of policy. I desire only to remind you that we stand pledged to pay a fair day's remuneration for a fair day's work and that the word "fair" means something commensurate with the conditions of to-day as they may exist in your locality. Under no circumstances should this be construed as having the slightest reference to any advance in a minimum wage rate and more than to a general advance to every employee.

If from this suggestion there will result an investigation by even a small number of employers, tending to advance wages to those employees who by their faithfulness and by their capabilities are entitled to receive better compensation, I shall feel that I have at least extended a helping hand to the deserving workman and assisted in placing him upon a plane above that of the minimum wage worker.

Legislation.

The co-operation of the association with the National Metal Trades Association in presenting employers' views of issues pending at Washington was continued in the past year. President Carpenter referred to the political intrigues attending the efforts of the labor lobby at Washington to secure the passage of anti-injunction legislation. He called attention, as his predecessor, Mr. Briggs, had done one year previous, to the activity of President Roosevelt and then Secretary of War Taft in aiding the Iron Molders' Union to secure a modification of the injunction issued at Milwaukee against the striking molders of the Allis-Chalmers Company. In the speaker's opinion, President Taft still entertains the view that he must yet do something in furtherance of the promise of his party's platform to modify the procedure of the courts in injunction cases. The speaker considered that "if on executive recommendation the court procedure in anti-injunction cases and the anti-trust laws are to be changed, then it behooves employers, business men and citizens generally to be more than ever on their guard to protect the rights which they have so well defended during the past eight years. . . . In this branch of the work, the burden of which has only of late years been thrust upon us, we have adopted the same methods which have meant success for us in the past—namely, a quiet and unostentatious pursuit of our object, casting aside any thought of notoriety or prominence as a result of what we may have accomplished."

Mr. Carpenter, citing a recent remark of President Taft that there are employers of labor who are "utterly opposed" to the organization of labor, said it would not be possible to find any large number of members of any employers' organization who do not believe that the primary purposes of labor organizations are good. "It is only when these organizations are controlled by the radical and socialistic element and resort to such measures as restriction of output, the limitation of a man's earning capacity, coercion, intimidation, riot and murder that employers condemn them and refuse them recognition as a body."

Employees' Compensation Acts.

On this subject reference was made to the meeting at Atlantic City in August of representatives of the commissions on workmen's compensation appointed by Minnesota, Wisconsin, Illinois and New York. A temporary organization was perfected with the understanding that the Labor Bureau of the Department of Commerce and Labor at Washington would have certain statistics to present later which will be of assistance. Referring to the expected report of the committee on this subject appointed at the last convention of the association, President Carpenter suggested that there is danger in committing an association such as this to an indorsement of any particular proposal. As yet none of the statutes passed in Great Britain, Germany and France has been long enough in operation to prove its efficiency in protecting alike the interests of the employer and the workman.

Indianapolis Foundry School.

The foundry department of the Winona Technical Institute of Indianapolis, which has the support of the National Founders' Association, is conducted upon a strictly commercial basis. As might be expected, it suffered in the general business depression of the past two years. The administrative council which visited the school in May, 1909, was favorably impressed with the appearance of the foundry building, equipment and the students. Several graduates of this foundry school have been placed in the shops of members of the association, and the first complaint is yet to be heard of their ability or general character. Several members of the association, it was stated, have given the school their backing by credit and cash, in addition to the aid voted by the association.

Instruction in Molding.

The widespread foundry strikes of late years have not been without their lessons, and the National Founders' Association staff has profited by the experiences gained.

The old plan of rushing in a large body of indifferent and incompetent mechanics at the inception of a strike, merely for the purpose of creating an impression, has been done away, but coincident with the discontinuance of these methods five or six years ago we devised a plan of entering into yearly contracts with a competent corps of independent molders who might be constantly at our command and whose services might be utilized as instructors for unskilled help, handymen and laborers who have at least become accustomed to the smoke and dust of the foundry, but have had no actual experience in ramming the flask, drawing the pattern or pouring off.

Because of the few strikes in the foundries of our members our force of contract employees is not as large as at one time, but if we are to have with us during the coming year the increased business activity which is promised on all sides, the association must replenish its force. If this necessity should actually present itself every possible attention should be devoted to the securing of high grade instructors in molding, who may be competent to enter the foundry and teach the raw recruit.

I desire to impress upon our members the fact that little or nothing will be gained permanently, when you are face to face with a strike, or when simply short of molders, by robbing the foundry of your neighbor and enticing his molders to come into your plant. There is no semblance of generalship in the pursuit of the policy of "robbing Peter to pay Paul." Molders have been taken from my own foundry under conditions such as these, and since I have been president of this association the very foundrymen who depleted my force have been the first to complain because some other proprietor had in turn replenished his supply

from their plant. Just so long as foundrymen follow this course they will be at the mercy of the union, and rightfully so. If you are expecting a strike make your preparation accordingly and lay your plans to build a new crew out of material found among the citizens of your own city who are much more likely to become fixtures in your foundry than the rover secured from a distance. Competent iron molders even now are finding little or no difficulty in securing work at fair wages in most any section, and it is not to be expected that they will leave that employment and journey a considerable distance without commensurate or even excessive compensation. The moment these excessive inducements are offered the entire status of the employment field is disrupted, and we find ourselves bidding one against the other for a commodity which each should produce for himself by the use of the competent instructor.

Internal Economy.

The questions of branch offices, secret service and membership were treated in successive portions of the address. The importance of conducting a strong campaign, through a special committee, to bring other foundry firms into the organization was emphasized.

What this association has accomplished in behalf of the general foundry industry is beyond the power of description in mere detail. An immense amount of money has been saved the industry and the entire scheme of the productive methods of the foundry has been revolutionized in a manner which in the course of years should remove it entirely from the possibilities of being subservient to the unwholesome dictations of any labor union. Yet there are hundreds of foundrymen who through motives, which we have thus far been unable to fathom, refrain from joining with their fellows in the continuation of the work. Content to accept their proportionate share of what we have accomplished, they continue on the outside, ever ready to accept of each succeeding advantage as it may be secured for them. No better evidence of the respect in which this association is held by the Iron Molders' Union would be desired than is contained in the union publications, wherein our organization is referred to as the most efficient ever devised.

In spite of the depression in business and the marked reduction in receipts due to the great increase in the number of foundry employees, the association has passed through the year without in any way disturbing its reserve fund. The president emphasized the necessity, now that the business outlook is brightening, of making provision for a special emergency fund, to be accumulated in the next four or five years. The fund of the Iron Molders' Union now approximates $200,000, and it is steadily growing.

Summary.

In conclusion, the address presented the folliowing recommendations as a summary:

The present policy of the association, adopted in 1904, dealing with the relations of members and their employees, should be continued.

A complete and accurate history of the recognition and non-recognition periods of the association should be prepared and given the widest possible publicity, even at great cost.

Fix firmly in your minds what we may term a maxim of the labor problem: Educate your own molders. Do not covet those of your neighbor.

Observe closely and constantly the services rendered by your individual workmen, and assure yourself that they are receiving proper compensation and working under just conditions, thereby minimizing the liability of the presentation of union demands.

Bear in mind that the strength of a voluntary employers' association will be measured entirely by the strength of its individual membership.

The responsibilities of membership should be more thoroughly appreciated by all of us, and we should not shirk those responsibilities by depending upon others to do that which we should do ourselves.

The usefulness of a conservatively aggressive employers' association is now an acknowledged fact. That its beneficial influences extend beyond the confines of its immediate membership is a matter of common knowledge. Therefore, those firms receiving and enjoying these benefits should be made to see that it is for their interest to share in the maintenance of such an institution.

The problem of membership is of great importance. Especially is this true in its reference to numerical and individual strength. The utmost care should be exercised both in the solicitation of new members and in their admission.

The coming session of Congress will bring with it a deluge of proposed labor legislation. None of this has passed previous congresses, but the union lobby is far more pretentious than that of the employers, and I recommend a continuation of our present methods and legislative forces in co-operation with other employers' organizations.

Secretary's Report.

The secretary, F. W. Hutchings, after reading the financial statement for the year, presented his annual report. In 1909 the association has had to deal with but two small strikes, whereas in 1906 there were 92; in 1907, 23, and in 1908, 4. This freedom from strikes is not to be taken as an indication that the Iron Molders' Union has abandoned the use of the strike as a method of enforcing demands. In 1908 this union carried on strikes in 74 cities, and in 1909 in 66 cities. It is estimated that the union expended for all purposes in 1907, $600,000; in 1908, $400,000, and in 1909, $250,000, and that its outlay has been fully $5 for every dollar expended by the National Founders' Association. At the time of the convention of 1908 the membership of the National Founders' Association was 419. There have been some withdrawals, due in nearly every case to the depression in business, and the present membership is 408. As illustrating the improvement in the foundry trade it was stated that the average number of employees in the foundries of the members was 30 per cent. greater in the quarter ending with September, 1909, than in the corresponding period of last year.

Commissioner's Report.

A. E. McClintock, commissioner of the association, made adequate labor supply and the use of molding machines the chief subject of his report. In the past year the association was called on to support one member on account of a strike, and assisted two probationary members who applied for membership with trouble pending, and later reimbursed the association for the expense incurred. There were numerous calls from members for conferences regarding threatened strikes. These difficulties were all adjusted between the firms and their men. With the return of prosperity the molders' union "is increasing the number of organizers to spread discontent, to foment a spirit of distrust, and try to regain the large number of members who dropped out of the ranks of the union after May, 1906." On the subjects of a better supply of mechanics and the use of appliances the report said:

Changes in Labor Supply.

During the past 18 months the average foundry has found great difficulty in obtaining sufficient work to keep its best molders employed and could do little or nothing in the way of taking on additional apprentices or handy men. Many molders have also left the trade and drifted into other lines of work. During the same period many firms have made additions to their foundries, many new plants have been erected, looking forward to the next wave of prosperity. When we again reach the flood tide of trade more workmen will be required in foundries than ever before in the history of this country. The query is, from whence will come the molders to supply the demand?

As the demand for molders increases the foundryman suddenly finds he has taken more orders for work than he can find molders to perform; and there immediately begins a general shifting of men from one shop to another and from one town to the next, while an increase in the force in one shop means vacancies in another, and the process works around in an endless chain. This is a condition which is quickly taken advantage of by the paid agitators, and soon the proprietor is waited upon with a series of "demands."

The education of apprentices and handy men is a profitable undertaking in those shops which go about it in the proper manner. To fail to educate as many boys and handy men as the shops or character of work will permit is suicidal. Many of our members, I am pleased to report, are doing their full duty in this matter, realizing that they can get better results by training their own apprentices and handy men than have their neighbor do it for them, and then take the risk of being able to hire them away. I recently visited the foundry of a member of this association conducting a very large and successful business, where the class of work is of a difficult character, and was informed that they had not in their employ a single molder or coremaker whom they had not educated since the strike of May, 1906. Many of their handy men are excellent workmen on the class of work they do, and are happy and contented. Had the strike and the enterprise of the firm not opened for them the door of opportunity, they know they would still be in the ranks of the unskilled, a laborer or a helper. Over against

this is the shop which is chronically short of molders, and investigation discloses the fact that the proprietor is indifferent to breaking in his own men.

Under the old order of things it may have taken four years to make a molder, but the best foundry practice today conclusively demonstrates that in from six months to two years a man of average intelligence and ability will become an efficient workman.

I urge you to more activity in this matter of educating apprentices or handymen. Get young men between the ages of 20 and 30 years, pay them living wages at the start and put them in charge of a skilled molder as instructor. In some shops employing a large number of men they select from their laborers and men about the yard those who are the most capable, and train them along definite lines. In a comparatively short time these men are able to produce excellent castings, and, while not all around molders, they meet every requirement on the particular class of work to which they are assigned. This work requires a great degree of patience and tact, but by good treatment and advancing the men from time to time as their work and ability warrants they can be made a part of the permanent force in the shop.

Appliances.

Five years ago, at the annual meeting, you wrote into the policy of this association the following clause:

> It shall be the right of the foundrymen to introduce molding machines and appliances of any kind, and to have the same operated by whomsoever he finds to his best advantage to employ thereon.

You then and there nailed your colors to the topmast, from which position they have floated ever since. Subsequent events have proved that that declaration was not mere idle words. You subscribed to them as a declaration of principle and I do not believe that any similar body of men in this country ever backed their convictions to a greater degree with their loyalty, their energy and their money. Neither do I believe there is any branch of the mechanical trade where more rapid strides have been made in the advancement of improved methods of manufacture than has been the case in molding castings during the five years referred to.

This advancement has been much more pronounced in the last two years, since the great strike of 1906, the result of which made it possible for foundrymen to introduce improved machinery, especially molding machines, and receive therefrom the advantage and benefits accruing.

The molders' union has waged many a bitter conflict to attempt to force you to recede from that position, but with what results? By these declarations and the determined and persistent support given, you have made possible the revolution which is now taking place in foundry practice. It was only a few years ago that molders in the shops of members of this association went on strike against the use of pneumatic rammers. The delivery of a molding machine at the foundry door meant a walkout of the then aristocrats of the sand heap. But we are at the dawn of a new day; for some of the antiquated rules of the molders' union the clock has struck 12.

In glowing words the leaders of the unions proclaim that they stand for the uplifting of humanity, the lightening of the burdens, and the removal of much of the arduous toil of the manual workman. We agree that those are commendable sentiments. But almost in the same breath these leaders express opposition to molding machines and other labor saving devices, by the use of which much of the hard labor of producing castings is done away with.

A few years ago the policy of the molders' union was to refuse to allow its members to work in a shop using molding machines. Nevertheless, regardless of their opposition, they saw the machines installed in the light work shops and operated successfully. Then the union changed its policy and said to the foundrymen: "We will permit the machines, but you must give us control." The members of this association tried for a number of years to work under that method, but it was an absolute failure. The union molder either refused to go on the machine, even under penalty of discharge, or, if he did operate the machine, the results were negative. On the other hand, if the proprietor became impatient with these tactics and undertook to break in or train unskilled men, a strike with the full sanction and indorsement of the union was the result. The unionist said the proprietor was stealing his trade. In other words, their control of the machine meant restricting the production to that of hand labor. * * *

During the past five years greater progress has been made in the use of molding machines and improved appliances than in the previous 25 years.

While it is my desire to make the subjects of labor supply and molding machines the central thought of this report, I wish to say just a word on keeping your workmen contented and satisfied. See that your good men are paid all the work will afford. Do not reduce costs by reducing wages, but rather devote attention to reducing the skill, the amount of labor required and thereby increase production and increase the amount in the pay envelope. Make it possible for men with from two to six months' training in the foundry to be able to increase their earning power from 50 to 100 per cent.

TUESDAY AFTERNOON.

Practically the entire session was devoted to the discussion of Commissioner McClintock's paper on "The Introduction of the Molding Machine." Isaac W. Frank, president of the United Engineering & Foundry Company, Pittsburgh, opened the session with a brief extemporaneous talk outlining the history of the molding machine. He said that he had been unable to trace the history back to what could definitely be called the first machine, but that his research brought him back to the makeshift which doubtless led to this designing of the first actual machine. This makeshift he described as simply a pair of guides connecting the cope and drag and making it possible to lift the cope and draw the pattern with mechanical accuracy. He said that this was really the first type of molding machine, because it was the first instance of the Iron Molders' Union taking official cognizance of a mechanical device. This cognizance led to the agreement between the Pittsburgh Foundrymen's Association and the Iron Molders' Union, resulting in the union's operation of the machine, which it was soon seen was only for the purpose of killing the machine. In the hands of the union molder the machine was productive of no more work than was the custom through the usual hand methods, it being found that when it was insisted that a man increase the number of pieces by aid of the machine, the extra work was invariably spoiled. It was, therefore, only when the machine was taken away from the molder and given to the handy man that the actual success of the machine ensued. The year 1896 really marked the beginning of this success of the molding machine. It has since been demonstrated that the handy man can operate the molding machine successfully, and as a result the machine has been developed to a high degree, the roll-over, jarring, jolt and various types of the machine being the successful solution to the requirements of various classes of work.

The most conclusive proof of the actual merit of the molding machine is that 10 years ago there was but one manufacturer of such machines, while to-day there are some 16. Mr. Frank stated that his company has adopted the machine with great success, and that the most important fact is that it has been conclusively demonstrated that the molder can be actually supplanted by the machine. He related an instance of where the complete output of a plant is now being turned out by means of the machine and at a saving of 60 per cent. of the former cost of the same tonnage.

Commissioner McClintock followed with stereopticon views showing a great variety of work now being regularly turned out at various plants, including those of the United Engineering & Foundry Company, Buckeye Engine Company, Deming Company, William Tod & Co., Filer & Stowell Company, Bucyrus Company, Allis-Chalmers Company and F. M. Prescott Steam Pump Company. One of the most remarkable views shown was of a complicated design of base for a triplex power pump produced by the Deming Company of Salem, Ohio. The casting was made for the Deming Company by the Buckeye Engine Company of Salem. The casting weighs 420 lb., the coremaking time consumed being 5 hours. The molding was accomplished in 40 minutes, which is less than 10 per cent. of the time formerly required by hand molding. The cost of the casting has been reduced about 75 per cent. A noticeable feature of Mr. McClintock's illustrations was that they indicated in many instances that the molding machine's saving did not stop in the foundry. This is due to the fact that the machines produce castings requiring considerably less machining.

In contributing to the discussion of Mr. McClintock's illustrated talk, E. Kneeland of the United Engineering & Foundry Company stated that since the adoption of the machines their losses in castings amount to less than 1 per cent. a month, as against 5 to 15 per cent. in former days.

F. C. Caldwell of the H. W. Caldwell & Sons Company, Chicago, suggested that perhaps the greatest value of the

machine was to prevent the situation so often encountered in busy times when the supply of skilled molders is inadequate.

In answer to an inquiry as to the exact description of a handy man, Commissioner McClintock answered that as a rule they were absolutely unskilled men placed on a certain machine on a certain class of work and kept at that work, thereby becoming specialists on that particular job. Their pay increased, he said, as they increased their output. In some cases they earn as much as $5 a day, but the quantity of their work warrants it.

E. A. Johnson, director of the Institute Foundry School in connection with the Winona Technical Institute, gave an illustrated address describing the interesting work accomplished by the students.

Thomas E. Durban of the Erie City Iron Works, Erie, Pa., submitted the report of the committee appointed last year to investigate the subject of Workmen's Compensation Acts. George F. Monaghan, attorney of the association, supplemented the report with a clear and comprehensive history of the subject, showing the undesirability of action at this time. The subject was referred back to the committee without action.

ANNUAL BANQUET.

The annual banquet of the association was held at the Hotel Astor Tuesday evening. President Carpenter introduced T. J. Drummond, Montreal, as toastmaster. The previously announced addresses of the evening were by President W. H. P. Faunce of Brown University, Providence, R. I., and ex-Governor Utter of Rhode Island. Both were pitched on a high plane and were marked by breadth and insight. The National Founders' Association has for several years had at its banquet prominent speakers and the result has been to give a distinction to these occasions that does not come out of any miscellaneous programme of toasts and responses. The speakers of this year emphasized among other things the demand for men with individual courage, with respect for law, and men not afraid to work. Ex-Congressman Littlefield, now of New York; John Kirby, Jr., Dayton, Ohio, president of the National Association of Manufacturers, and H. P. Eells, Cleveland, president of the National Metal Trades Association, were called upon after the regular addresses. The musical programme was of an unusually high order.

WEDNESDAY MORNING.

Insurance for Workmen.

The session Wednesday morning was opened with the presentation of a paper on the above subject by T. J. Richmond of the Buffalo Scale Committee, outlining a plan for insuring workmen which has been adopted by the Employers' Association of Buffalo, N. Y. He first explained the limitations of regular line accident and life insurance companies, partly imposed by law, which prevents an accident company writing life insurance and a life insurance company from writing accident insurance. What was needed was one policy to cover life, accident and health, where before it was necessary for proper protection for a man to carry both, and many felt that they could not afford it. After conferring with various companies to determine which could offer the most attractive policy, an arrangement offered by the Phoenix Accident Insurance Company of Detroit, Mich., was accepted. From all standpoints it seemed most advantageous. The rate was only $1 a month, the benefits very liberal as compared with those of other companies, and it offered half policies with half benefits at 50 cents a month to those who could not afford full policies. The most unique feature was the agreement with the Employers' Association that if it would permit the company's solicitors access to the shops and would collect the premiums, the insurance company would give the association a commission of 20 per cent. on the premiums collected. The association was thus able to establish a fund from which natural death benefits could be paid. The first year $100 was determined upon, but it is likely that in succeeding years larger natural death benefits can be allowed.

Before any steps were taken the association procured the approval of the State Insurance Department, which forestalled any opposition which might have arisen based on illegality of the plan. The labor unions have, however, offered little objection, for it was quickly shown to be of real advantage to the workmen, particularly as the rates were lower and the benefits more liberal than they could obtain from any other source. The insurance has been growing steadily in favor. The first policy was written in March, 1909, and there are now some 1200 in force. One advantage to the association is that it tends to keep its member employees from taking employment in outside shops, as for the time at least they would lose the natural death benefits.

In the discussion the speaker was asked what proportion of men in the shops are taking the insurance. Mr. Richmond replied that in his company's shop there are already about 25 per cent. insured, although the scheme has only been in operation about seven months, and there are indications of a much larger percentage as the men come to appreciate its advantages. In some other shops an even greater proportion of the men is insured; one shop has about 60 per cent. Another asked about the weekly indemnities, in answer to which it was explained that it depends in individual cases upon the hazard involved; that is, upon how dangerous is the job engaged in by the man insured. The indemnities range from $6.50 to $15 a week.

Under the next subject,

Legislation in Congress,

Marshall Cushing presented a report for the joint committee of the National Metal Trades Association and the National Founders' Association, of which he has been the representative in Washington. He explained what has been done lately to oppose class legislation—that is, the efforts of labor organizations to obtain the passing of special measures. Particularly he spoke of the success of the last eight years in opposing such class legislation and urged a continuance of such endeavor, indicated the prospect of success and outlined the best means of accomplishing results by constant vigilance and a campaign of education.

The next matter of business was a report from the Special Finance Committee, consisting of O. P. Letchworth, H. Woodland and G. E. Emmons. It was presented by Mr. Letchworth, covered the auditing of accounts and made recommendations which were referred to the incoming officers.

The meeting adjourned to reconvene in the afternoon to elect officers. This list of officers will be given in our next issue, as it was not available at the time of going to press. At the latest account the registration had reached 173.

American Car & Foundry Company Improvements.—The American Car & Foundry Company is expending a large amount of money in making improvements to its plant at Berwick, Pa., which will considerably increase the capacity. There is in process of construction, and which is expected to be ready for occupancy about December 1, an addition to the steel passenger coach finishing department, 55 x 1010 ft., of brick and steel construction, with slag roof and cement floor, lighted by a monitor running the full length of the building. This structure supplements a building 65 x 930 ft. of the same construction. The company has also been adding to its main steel car preparatory and construction department a building 90 x 465 ft., of brick and steel construction, which adds about 20 per cent. to the present floor space in that department. In addition to the buildings the company is adding considerably to its machinery equipment and is spending $50,000 on reorganization and additional equipment in the power house, producing hydraulic, pneumatic and electric power for the shops.

The American Shipbuilding Company has taken orders for two more lake freight boats for delivery next spring. Each will be of 9000 tons capacity and 524 ft. in length. The lake shipbuilders now have orders for more boats than at any time in the past three years.

September Exports and Imports of Iron and Steel.

The September report of the Bureau of Statistics of the Department of Commerce and Labor records a slight decrease in exports and an increase in the imports of Iron and steel in that month as compared with August. The value of the total exports of iron and steel and manufactures thereof, not including ore, was $12,966,908, against $14,136,219 in August. The total value of the same class of imports was $2,703,829, against $2,576,969 in August. The exports of commodities for which quantities are given totaled 97,393 tons in September, against 105,695 tons in August, 100,681 tons in July, 114,751 tons in June, 109,977 tons in May, 100,904 tons in April, 94,523 tons in March, 84,860 tons in February and 70,085 tons in January. The details of the exports of these commodities for September and for the nine months ending with September are as follows:

Exports of Iron and Steel.

	September,		Nine months,	
	1909.	1908.	1909.	1908.
	Gross tons.	Gross tons.	Gross tons.	Gross tons.
Pig iron	2,862	4,116	40,667	30,568
Scrap	1,491	2,654	23,541	17,091
Bar iron	735	890	9,672	5,691
Wire rods	372	559	10,671	4,463
Steel bars	6,657	3,922	51,373	32,561
Billets, blooms, &c.	10,475	7,300	94,594	86,315
Hoop, band, &c.	249	309	2,294	3,457
Steel rails	23,478	17,311	189,784	156,098
Iron sheets and plates	6,117	2,952	50,955	32,128
Steel sheets and plates	10,974	5,608	73,871	43,594
Tin and terne plates	610	70	6,821	11,401
Structural iron and steel	7,473	9,538	68,433	91,448
Barb wire*	4,233	4,902	49,148	†13,222
Wire*	3,741	4,563	60,046	86,324
Cut nails	772	241	6,680	5,533
Wire nails	2,185	1,862	21,124	20,292
All other nails, including tacks	538	527	5,837	3,536
Pipes and fittings	13,831	9,408	112,955	85,962
Totals	97,393	73,132	878,466	729,684

* Not separately stated prior to July 1, 1908.
† Figures are for July to September, inclusive.

The imports of commodities for which quantities are given reached a total of 32,166 gross tons in September, against 22,121 tons in August, 29,136 tons in July, 19,402 tons in June, 18,352 tons in May, 17,772 tons in April, 20,714 tons in March, 19,418 tons in February and 19,782 tons in January. The details of imports of this class of products for September and for the nine months ending with September are as follows:

Imports of Iron and Steel.

	September,		Nine months,	
	1909.	1908.	1909.	1908.
	Gross tons.	Gross tons.	Gross tons.	Gross tons.
Pig iron	12,601	8,339	99,823	65,280
Scrap	9,886	404	14,263	3,666
Bar iron	1,718	718	11,662	15,034
Rails	157	30	539	1,124
Billets, bars and steel in forms n.e.s.	1,434	584	11,853	7,194
Sheets and plates	432	261	2,657	1,785
Tin and terne plates	4,347	1,527	44,388	49,712
Wire rods	941	774	8,548	8,570
Structural iron and steel	650	313	4,564	1,785
Totals	32,166	12,950	198,297	154,150

The imports of iron ore in September were 164,613 gross tons, against 209,855 tons in August, 172,316 tons in July, 124,714 tons in June, 97,393 tons in May, 74,782 tons in April, 108,676 tons in March, 61,749 tons in February and 105,233 tons in January. Of the September imports 84,980 tons came from Cuba, 37,978 tons from British North America, 36,081 tons from Europe and 5574 tons from other countries. The total imports of iron ore for the nine months ending with September were 1,119,331 tons, against 482,908 tons in the corresponding period of last year and 972,340 tons in the same months of 1907.

The total value of the exports of iron and steel and manufactures thereof, not including ore, in the nine months ending with September, was $113,920,860, against $116,480,761 in the corresponding period of last year. Similar imports in the nine months ending with September were respectively $20,878,321 and $14,923,195.

Canadian Industrial News.

The Hamilton Steel & Iron Company.

TORONTO, November 6, 1909.—C. S. Wilcox, president of the Hamilton Steel & Iron Company, Hamilton, Ont., has given out a statement to dispose of certain rumors that have lately been current as to changes in the control of the company, &c. Some changes had been made in the directorate and it was alleged that these reflected a passing of the majority interest into other hands, and that the balance of power in the company's affairs had passed from Hamilton shareholders to Toronto parties identified with the Canadian Pacific Railway Company. The new directors, E. B. Osler, M.P., and W. D. Matthews, are both Toronto men and are both directors of the Canadian Pacific Railway Company, but President Wilcox says unequivocally that Hamilton people still hold a controlling interest in the company. In his statement he says: "The rumor that the Canadian Pacific Railway Company has obtained control of the company or is trying to obtain control is absolutely incorrect."

The explanation given of the recent activity in the company's stock is that a number of estates holding considerable blocks of the stock have sold to Toronto and Montreal purchasers. In the official statement no denial is made of the rumor that the company is to be drawn into a merger with the steel companies of Nova Scotia and other corporations engaged in kindred production. Of course it would be premature to speak of merger negotiations that were still pending, and silence in respect to that particular rumor does not necessarily imply a denial of it. It has been suggested that the admission of Mr. Osler and Mr. Matthews to the board may have been with a view to promote the company's interest in merger negotiations, as they are men of financial weight and influence, both being directors of the Dominion Bank, Mr. Osler being president. In the official statement the information is given that "the company is now engaged in making considerable extensions to its plant, and the question of still further enlargements will immediately receive the consideration of the directors, and the probability is that these enlargements will be proceeded with at an early date." It is added that Mr. Wilcox will continue to be president of the company and that Robert Hobson will remain as general manager. The Hamilton *Spectator*, owned by a company of which William Southam is the controlling spirit, goes into some details as to the enlargements. As Mr. Southam is one of the directors and principal stockholders of the company, the particulars given in his newspaper are doubtless to be relied upon. New bolt and bar mills are to be built, and in all probability the cost of the extensions will reach $1,000,000. The *Spectator* further says: "The company's business will be on a much larger scale than heretofore, and its scope will be of a continental character."

The Electric Furnace Products Company.

Of the numerous important industries established in the Niagara peninsula of Ontario—Welland, Niagara Falls, Chippewa, Tharold, &c.—as a result of American enterprise and the development of Niagara power, is that of the Electric Furnace Products Company. This, which was begun some time ago in Chippewa, is in a very forward state of construction. The furnace section is to be completed by Christmas. It covers an area of 120 x 130 ft. The concrete walls are 23 ft. high and carry a steel superstructure. The plant was designed by the same architect as was that of the Electro-Metals of Welland. The company will manufacture an abrasive by a process of electric smelting. Until quite recently the parties that appeared most prominently in the negotiations with the municipality in respect to this industry were of a firm of electrical chemists at Niagara Falls, N. Y. It is now stated that the real principal is the Norton Electric Products Company. Electricity to the amount of 10,000 hp. has been contracted for, on behalf of this Chippewa plant, with the Ontario Power Company. C. A. C. J.

THE IRON AGE

Established in 1855.

New York, Thursday, November 11, 1909.

Entered at the New York Post Office, as Second Class Mail Matter.

DAVID WILLIAMS COMPANY, - - - - - PUBLISHER
14-16 PARK PLACE, NEW YORK

CHARLES T. ROOT, - - - - - PRESIDENT
CHARLES KIRCHHOFF, - - - - VICE-PRESIDENT
W. H. TAYLOR, - - - SECRETARY AND TREASURER

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Trade Regulation.

The New York *Times*, in its issue of November 8, gives voice to the erroneous impression which prevails outside the iron trade with regard to the relations of the large steel producers. It says:

By all odds the most interesting news that came to light in business circles last week was that relating to the efforts which are under way among the larger copper producers to effect an arrangement, along the line of that existing among steel producers, to regulate the production of the metal. The copper industry has been lagging far behind all other branches of trade in the recovery which has been going on for a year or more, and the reason is found in the production and attempted marketing of supplies of copper which could only be absorbed in the most prosperous times. It is a matter of record how closely production was fitted to consumptive capacity by the steel makers throughout the lean months of the recent past, and similar regulation on the part of the copper producers is plainly essential to the best interests not only of the producers themselves, who can then count upon a stable market for their output, but also of consumers, who, as matters now stand, hardly know from one day to the next upon what terms they can fill their requirements.

It is due to the steel manufacturers of the country that such a statement as this should not go unchallenged. The copper producers will not find in the steel trade a system of regulation of output that can be taken as an example for them to follow. When the panic of 1907 was precipitated, the production of iron and steel was at once curtailed by the force of circumstances and not by agreement. Many consumers canceled their contracts with producers, and to those who did not ask for cancellations the producers were often unwilling to make shipments because of the uncertainty of payment. The manufactured product was too expensive to accumulate or was of a character not readily available for making up for stock because of the varying specifications of buyers. Hence came that condition of production above referred to by the *Times* when it says: "It is a matter of record how closely production was fitted to consumptive capacity by the steel makers throughout the lean months of the recent past." Production was increased at a very slow rate for a long time, and then only as orders increased.

The only regulation attempted in the steel trade was that very mild form of price maintenance brought about by the persuasiveness of Chairman E. H. Gary of the United States Steel Corporation. Through his efforts the various manufacturers in the several branches of the steel trade were prevailed upon for a considerable time to refrain from making the usual sharp cuts in prices which had before unfailingly accompanied a period of severe trade depression. No hard and fast agreements were made, and occasional departures from the strict maintenance of prices were not seized upon by competitors as an excuse for breaking the market. No attempt was made to curtail production by concerted action. Never before, it is believed, was such a state of affairs seen in a great industry—so great and with so many independent interests that it was impossible to be controlled. Of course, a time came when competition for business grew too strong for the larger manufacturers to preserve their equanimity and prices were then cut wide open.

The copper producers, it is to be hoped, may devise a plan to relieve them of the troubles with which they are now struggling, but it will have to be of a totally different character from anything now effective in the steel trade or ever in force in it. The steel trade has suffered at times from over capacity for production, but never from an accumulation of manufactured product in producers' hands.

Simple Machines as Special Tools.

So great have been the improvements in machine tools that a new class of specialization is making a beginning. It is the development of standard types designed to be as simple as possible in mechanical details. The purpose is to produce a tool which can be built and sold cheaply, though it is just as powerful and accurate as tools having far greater range of action. The latter day tendency has been toward a very wide scope of usefulness in a single machine and hence complication of design. The ranges of feeds and speeds and screw pitches in gear boxes have increased to a remarkable extent, though there has been a slight reaction in this respect. In the rush of competition the added features have followed in rapid succession. Thus a field has been made for specialists whose purpose is to build standard tools constructed as well as any, but with closely defined limitations to their fields of work, and modifications to meet the wants of individual users. The number of feeds and speeds will be cut down to the lowest possible point. The mechanism throughout will be of the plainest. The idea is to appeal to the buyer who operates large shops and who can afford to install a certain percentage of machines of which no great variety of work is required.

That a plain machine, without the improvements of modern design, except in power and strength and accuracy, is coming to be considered in some respects a special tool, may sound like an exaggeration, an anomaly. It is claimed by some builders and dealers that customers are given to talking simplicity of design, but when they come to purchase they turn to the latest models. Doubtless this is true in some cases. Perhaps the buyer may be influenced by the arguments of those who prefer to sell the higher priced machines. But if he can be shown that he can save a large per cent. on the purchase price and still make no sacrifice in the efficiency of his works, price may count for a good deal, according to the exponents of the simple machine. Contact with users of machinery would incline the layman to this latter view of the case. But in the rapidly growing demand for machine tools of the better class, the trend being strongly toward the high grade machines, there will be room enough for all sorts of special lines. That which caters to the simpler wants of the machine shop, or to the purposes of "manufacturing," will have its place, though it will not supersede to any important extent the splendid creations of the modern American designers, with their refinements of mechanisms and their wonderful range of work.

The Increase in Foundry Iron Production.

One feature of the pig iron production statistics for October which merits attention is the emphasis they give to the momentum recently acquired by the merchant blast furnaces. This points to a greater activity in foundry iron than has been known in more than two years and confirms the testimony given by market reports from week to week. The low point in production of pig iron by steel companies in the past seven months was reached in April, and since that month they have increased their output by nearly 60 per cent., or from 36,436 tons a day in April to 56,973 tons a day in October. On the other hand the merchant furnace output decreased steadily from 22,609 tons a day in February to 19,123 tons in July. It rose to 21,192 tons a day in August, to 24,146 tons in September and to 26,656 tons in October. This represents nearly as great an increase in two months as the steel works furnaces made, as appears from the record of daily production for the two classes of furnaces:

	Steel works.	Merchant.
August	51,354	21,192
September	55,361	24,146
October	56,973	26,656
Increase, August to October	5,619	5,464

The information furnished us as to the kind of iron produced by furnaces going in or out in October indicates that four furnaces (3 steel works and 1 merchant) blown out last month were producers of steel works pig iron; and that an equal number of furnaces blown in in the month produced the same class of iron. It would appear, therefore, that the net gain of 10 in the number of active furnaces between October 1 and November 1 (from 399 to 409) is all to be credited to the list of furnaces producing foundry pig iron.

It is not to be inferred from the fact that the merchant furnaces last month exceeded their output in October, 1907 [the steel works furnaces did this in August of this year], that foundry activity as represented by the consumption of foundry and malleable Bessemer pig iron and the irons used by the steel foundries has again reached the pace of 1907. The contrary is known to be the fact. Working forces must still be considerably increased to equal those of 1907. Another measure of the situation is the fact that the merchant furnaces, as well indicated in the past 60 days by transactions in basic iron in eastern Pennsylvania and in Bessemer iron in the Central West, are making much more pig iron for the steel works than in the fall of 1907. But while foundry iron requirements and production are considerably short of those in 1907, it is plain that the foundry industry is no longer such a laggard in the race as it notoriously was in the summer and early fall months.

Another interesting indication of the October blast furnace figures and of the active capacity at the opening of November is that pig iron production in the United States in 1909 will closely approach if it does not equal the record of 25,781,361 tons in 1907.

The Buenos Aires Exposition.

In another part of this issue will be found an article calling attention to the international exposition to be held at Buenos Aires, Argentina, in 1910. The intention of the article is to interest American manufacturers in the opportunity afforded by this exposition to bring their products before the people of the Argentine Republic, which is one of the most progressive countries on this continent. Undoubtedly the exposition means a great deal to the manufacturers of the United States if they will simply take advantage of it. In the opinion of men who have most extensive interests in the export trade, this is far more important than any exposition held outside of the United States in recent years.

The impression prevails that communication with Argentina is more or less difficult, many of our people assuming that all American merchandise is shipped there by way of Europe. Quite to the contrary, there is abundant means of communication between this country and Argentina, comprising about three cargo steamers weekly. In the busy season there is frequently one steamer a day leaving this country for the River Plate. Those manufacturers who desire to exhibit their products at Buenos Aires, and have not yet secured space, should make haste in forwarding their applications.

Fire Precautions in Cold Weather.

Underwriters advise that careful inspection of factories should be made before the cold season sets in, with a view to eliminating unnecessary fire risks. With the beginning of winter an increased number of fires is usually noted, and a large percentage of them is due to the accumulation of rubbish or to the exposure of inflammable materials, so that carelessness or other cause may result in ignition. Inspection is a simple matter, but, as has been the subject of frequent comment, responsibility is lacking. The owner has not delegated the duty in a way to keep some one person keen in the pursuit of possible danger. Consequently no one attends to it.

With the return of cold weather, conditions change within an industrial plant. The days are short, and working hours overlap into the evening. Employees stay indoors during the noon hour. The heating pipes and coils, radiating high temperatures from exhaust steam, dry everything within close proximity. The contents of fire buckets are soon evaporated in the dry atmosphere. Some men have the untidy habit of stowing rubbish in obscure places. Where night shifts are employed, the carelessness of some of the workmen is still more important in this connection, for usually they are not watched so closely. The lighted match is more in evidence. The danger is present, especially in older buildings, which have few fireproof features, but it exists to a greater or less degree in all establishments, and is to be avoided only by constant vigilance. Even in the boiler room, where fires are always running, the winter is a time when frequent thorough inspection is desirable.

Careful examination of the premises, that the freezing of pipes in severe weather may be avoided, is another factor in the inspection. A fire system should be guarded with sedulous care against the chance of inaction in an emergency. A frozen main has led to many a conflagration which would have been checked in its incipiency had the factory fire service done its duty. Fire pumps must be installed in a manner to preclude the chance of freezing. This is necessary, not only in keeping the apparatus free for instant use, but also because the ice may cause permanent injury, leaving the pump useless until repairs are made. Frequent tests alone can show if damage has been sustained. Pump builders have hundreds of repair jobs each spring, resulting directly from exposure to low temperatures.

Burton Fils of Paris, representatives of large American manufacturers, write that some one unknown to them has falsely been introducing himself in the United States as one of their people.

Iron Trade Reminiscences.

Remarks of Joseph G. Butler, Jr., at the Dinner to Chairman Gary.

In responding to the toast "Raw Materials" at the dinner given Chairman E. H. Gary of the United States Steel Corporation by the independent steel companies October 15, Joseph G. Butler, Jr., Youngstown, Ohio, gave some entertaining reminiscences of iron manufacture in the Central West. The extracts below from the stenographic report of the address will be found of interest:

A concern that I helped to manage had a little furnace at Youngstown under lease, and it ran on Brier Hill coke, of which you may never have heard. It is a sort of natural coke; they used it in its natural state without coking. I came across, in looking over some old letters not long ago, a letter written by the superintendend of that furnace in 1853. That is before a great many of the people here were born. It was rather hard to decipher, but I made a copy of it, and, with your permission, I will read it to show what raw material was 56 or 57 years ago.

"Youngstown, Ohio, August 25, 1853.

"To James Ward & Co.:

"We have here the proceeds for last week: August 13, 90 charges, 400 lb. coal, 460 lb. ore., 160 lb. lime, 7½ tons of pig iron." [And then there are five more dates, and it ran from 7 to 7½ tons. The total product that week was 47½ tons.] "Our next payroll will amount to something like $200 and we ought to have at least $20 in cash."

Now, in those days, you know, they paid in orders on the stores and nobody thought of paying the men in money. The men got a dollar on the Fourth of July and a dollar on Christmas, and a good many of them hastened to spend it for fear somebody would look at the bank note protector and find it was no good. That was the condition in those days. There were no railroads, and everything was done by teams and canals.

I remember another incident that might possibly be of interest here. When I was a boy not more than 12 years old there came a gentleman into town well dressed for that day. He had long, flowing hair and was a fine talker. The hotel in the town was rather poor and he stopped at the home of Mr. Ward, where I was living. He spent two days there; he was very enthusiastic and said he had a new way of making steel. He talked us all to death. I thought he was crazy. I thought Mr. Ward thought he was crazy, too. It turned out afterward that he was not. This man was William Kelly, who, I think, was really the first to discover the pneumatic or Bessemer process of making steel.

It is rather singular that all the great discoveries and processes since the cementation process were made on the other side of the water. Think of it! The Bessemer, Siemens, Martin and electric processes were all apparently originated on the other side. Our old world friends had the originality and we had the adaptability. There is no telling what is due to such men as Holley and Fritz and a dozen others that I could name, who have done much to develop all these different processes; but the fact remains that all these great discoveries were made on the other side of the water. We, however, have developed them. I am proud to say that the first real stride in making a larger output of pig iron was at the furnaces of James W. Kennedy, father of Julian Kenneedy, the great engineer. At that time we were running by the old rule of thumb, running the furnaces by pressure. Mr. Kennedy introduced blowing by revolution, and that is the way it is done now.

I suppose there are some people here that do not know the first blast furnace started by the Carnegie Steel Company was removed to Escanaba, Mich. I do not know why they removed it. I think there was not much but the shell of it, and they could have gotten a new shell for about half the money. Furnace A of that steel plant was removed to Escanaba, where is not anything but ore; there is no coal, no coke, no limestone. Nobody knew anything about running the furnace or they would not have moved it.

I am going to relate a little circumstance. After Mr. Schwab was elected president of the Carnegie Steel Company I received a telegram from him asking me to come to Pittsburgh the next day. I did not wait until the next day. I went that night. I was on hand bright and early the next morning, and Mr. Schwab was also. I found a young fellow there in knickerbockers with a printed schedule of my pedigree, and what my business was had to be given, so that I could get in. I finally got in. Mr. Schwab said: "Mr. Butler, we want to get some Bessemer pig." "All right; how much do you want?" "We want 300,000 tons." I said, "Well, now, we can furnish that in certain deliveries." "What will the price be?" I told him what it would be. "All right, we will take it." "All right, I will go home and make out the contracts." I started to go. I got to the door and he said, "Mr. Butler, I guess we will make that 400,000 tons." "All right." I had looked at my watch when I went in and I looked at it when I went out. It was exactly four minutes. I do not think Mr. Schwab looked at his watch. Anyhow he got the pig iron.

I remember another circumstance. We had a board meeting at one time at our Brier Hill concern and some of the directors were a good deal concerned, too. We were selling a good many people, including the original Carnegie company. The old-fashioned way of selling pig iron was on four months' time, and once in a while they would ask us to give them six months. I remember we had this subject up in the board meeting. There were some of our board that thought it was taking a good deal of risk to sell pig iron on four and six months' time. Well, we had a good deal of talk about it and I said, "Now, I think Mr. Carnegie is good, and I believe that they are all right. You just let me alone, now, and we will get our pay for all this"—and I tell you we were pretty anxious to sell pig iron. Some of our banks needed the paper, too. That is the way we used the paper in the olden times. We don't do that now. Now we put up collateral and all that. In the olden time they had this four and six months' paper and the banks were just loaded. They never expected some of it to be renewed. Well, anyhow, my idea prevailed, and I am very gald to be able to say that Mr. Carnegie and Mr. Phipps and the other people paid us for all that they got and we never lost a cent on them.

Customs Decisions.

Arsenical and Manganese Copper.

In partially sustaining a claim filed by R. F. Lang, New York, the Board of United States General Appraisers holds that arsenical copper is not composed of alloy in chief value of copper, and is not, therefore, free of duty under the provision in the tariff of 1897 for "composition metal," of which copper is a component material of chief value. On the other hand, manganese copper, imported by Mr. Lang, is held to be entitled to free entry because copper is found to be the element of chief value. Duty was assessed on both metals at the rate of 20 per cent. under the tariff provision for "unwrought metals." General Appraiser Fischer, in his decision for the board, says in part:

> The proof offered as to the arsenical copper shows that alloy is not in chief value of copper. We regard the collector's assessment thereon as proper and hold its classification under paragraph 183 to be correct. As to the manganese copper, it appears that, in the fusing of the ferromanganese and the copper, about 5 per cent. of the iron is lost in the manufacture of the alloy, and that in its imported form the alloy contains from 25 to 30 per cent. of manganese and from 2 to 4 per cent. of iron.
>
> This quality of manganese copper is invoiced at about 1.50 marks per kilo or less, and we find from the proof offered that it is in chief value of copper. It is a metal in the form of an alloy, used solely as a raw material. The provision for "all composition metal of which copper is a component material of chief value," in paragraph 533, supplies a more specific designation for the said metal alloy than paragraph 183, as assessed. We sustain the claim for free entry, so far as the items referred to in the schedule hereto annexed are in question, and to that extent the decisions of the collector are reversed, and in all other respects the protests are overruled.

The Buenos Aires Exposition.

Among the many interesting features on the programme to commemorate the centenary of Argentine independence, none is expected to exceed in size or importance the International Exhibition of Railways and Land Transports which is to be held in Buenos Aires from May to November, 1910. Every effort has been made to create an exhibition complete in every respect, to which end the assistance of foreign countries has been solicited.

The exhibition will occupy an area of 180,000 sq. m. (45 acres), half of which is intended for buildings and half for streets, gardens and other ornamental purposes. The space will be inclosed by the streets of Santa Fé, Gutemberg and Dorrego, the embankment of the Central Argentine Railway, Cervino, and the great avenue of Maldonado. A better site could hardly have been selected, since, in addition to the desirable character of the boundary streets, the location is surrounded by railroad and the street car lines, giving easy access to the exhibition ground, to which facilities are to be added two large railroad stations on the lines of the Pacific and Argentine companies.

Character of the Exhibition.

The scope of the exhibition includes displays as comprehensive and detailed as possible of steam and electric railroad equipment, motor cars, carriages and wagons, military transportation, aeronautics and kindred trades.

The railroad portion of the exhibition is not to be confined to a display of rolling stock, rails, bridges and the more prominent features of transportation lines, but will include everything pertaining to their management and operation throughout all departments. From rolling stock to office supplies, nothing is to be overlooked. The list will include models, drawings or photographs of stations for passenger and freight purposes, platforms, tunnels, and viaducts for communication between platforms, fixed and automatically moving stairs, grain carriers, cattle docks, locomotive and car sheds, factories for the production of gas and electric light for the illumination of stations and trains, apparatus for preventing and extinguishing fire, apparatus and systems for prevention of accidents, permanent gang houses and cabins for yardmen, office furniture and fixtures, including typewriters, adding machines and systems of filing. Systems of accounting and statistics, instructions for service, methods of advertising and legislation, and rules and regulations of operation will be included. Under this group will also come means of conveyance resembling railroads and detailed plans for loading and unloading and for transshipping. While it is probable that many of the larger items, such as roundhouses, car barns, grain elevators, &c., will be shown by detailed plans only, it is the expectation that a number of cars and locomotives suitable for use in Argentina and many models will be displayed. The character of individual exhibits, being optional with exhibitors, will be observed with no little interest by visitors possessed of local or national pride, and it is earnestly hoped that citizens of the United States will have no cause for disappointment.

An equally comprehensive exhibit is expected of tramways and street car lines. It is expected that models or plans of steam and hydro-electric power stations, engines and boilers, dynamos and electric motors, and auxiliary electric apparatus for power stations will be exhibited. Rolling stock will, of course, be featured, but a no less important part of the exhibition will be permanent way construction, together with line work and signal apparatus. Various systems insuring safety of passengers and the rapid handling of surface lines will be indicated. Under this group of exhibits will also come the application of electric traction to mines, industrial transports and aerial tramways. Various statistics and documents relating to the protection of employees, publication and legislation will be featured.

Motor Cars and Carriages to Be Shown.

That full advantage may be taken of the name "Railways and Land Transports," opportunity will be afforded for the display of motor cars together with single parts for purposes of erection. This exhibit will include complete motors for liquid fuel, gas and steam, and for electricity as applied to carriages and cars; systems of transmission of power, axles, frames, tires, wheels and safety appliances.

Further, there will be an exhibition of carriages of all classes for use in town and country, at the races and for special service, as well as of wagons for light and heavy work. A display of saddlery and liveries will be made, and the raw material for the production of the various exhibits will also be shown.

An interesting feature of the exhibition will pertain to transportation, for military purposes, of persons, provisions, ammunition and artillery, and to the transportation of wounded by hand barrows, litters, and on the backs of men, mules and horses. The military exhibition will deal with everything pertaining to the preparation and sustenance of an army, and will be complete in every particular. Hygiene of railroad buildings and rolling stock will be given special attention, as well as the sanitary arrangements of camps.

It has been deemed advisable to include in the programme an exhibition of free and captive balloons, dirigible balloons and aeroplanes, in view of the widespread interest which has been shown in this new mode of possible travel. It is probable that aviators will be called upon to give demonstrations of the various flying machines, which would prove an interesting part of the exhibition.

Activity of Other Countries.

The work of preparing the exhibition has been put in the hands of an Executive Committee appointed by the Argentine Government which is being assisted to a marked extent by a number of foreign countries. The Germans especially are making energetic preparations, having appointed five commissioners, one representing the Imperial Government, one the Prussian Diet, one the Steelworks Union (the great Steel Syndicate), and two others, this commission being headed by the men who had charge of the German exhibit at the St. Louis Fair. It is their expectation to put up their own building and have all the German display under one roof. Italy and Holland have also interested themselves in forming local associations in Buenos Aires with the same project in view, and other countries are expected to take an equal interest. England is understood to have taken 10,000 square meters, and Germany, France, Italy and Austria each 6000 square meters, which enables these countries to have their exhibits in separate buildings.

Applications for space from the United States have only totaled 3000 sq. m. (32,289 sq. ft.), and before a separate building can be assigned to the American exhibit it will be necessary to file applications for 2000 sq. m. additional; the interest of a number of manufacturers who have previously not considered exhibiting is being aroused with this purpose in view. The United States has not, thus far, shown as great an interest as was expected and as the possibilities of the exhibition might warrant, the space already allotted having been taken principally by the larger manufacturers. There is a noticeable lack of applications from the smaller manufacturers, whose products in themselves do not occupy much space, but whose exhibits, it is believed, could be made of undoubted value to the exhibition and to the exhibitors. Doubtless this is due to the fact that on first sight the difficulties of making an exhibition in Buenos Aires seem great and the advantages questionable, but it should not be said of American manufacturers that they are unable to cope with their competitors in foreign markets. The exhibition as proposed affords a magnificent opportunity for the display of an innumerable variety of products, and every possible assistance, courtesy and consideration will be given to exhibitors of goods of American manufacture.

Although the date for the final allotment of space was originally set for October, it has been extended to December 1, to admit of applications for space on the part of manufacturers who may wish to participate. Full information can be secured from John Barrett, Director of

the International Bureau of American Republics at Washington, who is in close touch with matters pertaining to the exhibition. Several well-known manufacturers of cars and locomotives, as well as some of our most prominent manufacturing interests, have signified their intention to exhibit. There seems little doubt of the direct advantages that will be gained by those who take part in this exhibition, and a far better insight into the needs of Argentina will also be secured than exists today. There is a fair field for all comers, and with the well-known superiority of American goods as a foundation it only remains to establish friendly relations with the consumers to secure at least our share of a business which is growing larger every day.

Seth Boyden, Inventor.

An Interesting Exhibit Commemorating the Discoverer of Malleable Cast Iron. Who Was a Many-Sided Genius.

In connection with an exhibit now being made at the Newark Public Library, Newark, N. J., denoting the historic progress of the city, citizens of Newark interested in industrial affairs are doing honor to the memory of Seth Boyden, inventor and worker in metals, who made discoveries of considerable importance to the mechanical world, but whose history as an inventor is more or less forgotten. The exhibit consists of patent papers and relics of Boyden's workmanship, and they show him to be a many-sided man whose mind was crowded with much practical and some impractical knowledge. His chief claim to fame is probably in connection with the discovery of malleable cast iron, which is attributed to him, and which has been questioned, but never successfully disputed.

Seth Boyden was born in Foxboro, Mass., in 1788 and died in 1870. He was a blacksmith by trade and his life is a continuous story of ideas, suggestions, guesses, experiments, failures and some notable successes. He became a resident of Newark at the age of 27, and it was during his residence there that he developed his most useful ideas. At the age of 15, when apprenticed to a blacksmith in Foxboro, he repaired watches for the villagers and was even then experimenting in metals, among his boyhood achievements having been the engraving of a book plate for himself and the portrait of George Washington on steel. Another indication of his versatility was the painting of a rather creditable miniature of himself when he was 18 years of age.

How He Discovered Malleable Cast Iron.

The history of his discoveries in connection with the working of malleable cast iron dates back to his apprenticeship days when, in assisting in the repair of a furnace, he found part of a cast iron bar which had been near the edge of a fire bed and which had been subjected to the action of the fire, but nevertheless had the appearance of wrought iron. By experimenting with the bar he found that by heating the section which had been in the fire of the furnace he could draw it, while the other part was hard and brittle. He continued his experiments, but it was not until July 4, 1826, that he succeeded in casting malleable iron. He shortly afterward erected a malleable iron foundry in Newark, and in 1838 sold out to a corporation which was known as the Boyden Malleable Cast Iron & Steel Company. At the time the sale was made Boyden's business catalogue stated that he could manufacture 1000 "plain and ornamental patterns of iron articles."

Although Boyden made his discovery in connection with malleable iron in 1826, he did not patent it until 1831, and the credentials he was then given are on exhibition now at the Newark Public Library and they bear the signatures of Andrew Jackson, President, and Martin Van Buren, Secretary of State. Boyden later went into the manufacture of patent leather, he being the first to produce glazed leather, as it was then called, in the United States. He sold out this enterprise and turned his attention again to the working of metals when he evolved oreide, sometimes called French gold, which is similar to gold and out of which he made watch cases and spoons. He is also declared to have discovered the process of manufacturing Russia planished sheets. A notable achievement of Boyden was the construction of the first two locomotives to be operated on the Morris & Essex Railroad, later the Delaware, Lackawanna & Western Railroad. In 1837 he built two engines for that company which, to the surprise of the purchasers, were able to draw a train up a grade of 140 ft. to the mile, which had been thought impossible of accomplishment. Boyden was the first to place an engine driving rod outside of the axle, before that time the power having been communicated by means of a crank.

Steam Engine Improvements.

In 1854 he applied for a patent on a cut-off valve regulating the amount of steam injected into the cylinder of an engine, but when the Patent Office asked him to furnish a model he characteristically paid no further attention to the matter. In his notes, on exhibition at the Newark Library, he states on the subject of his improvement on steam engines as follows: "My first improvement on stationary steam engines was the cast iron frame or bed; my next was the introduction of a straight axle to the locomotive in place of the crank which is now universally used. My greatest invention in the steam engine was the cut-off in place of the throttle valve and connecting the cut-off with the governor together." It is also claimed that Boyden invented the duplex valve gear, such as is found in the valve gearing of duplex steam pumps. Other inventions of his were a machine for making nails, one for splitting leather and one for forming hat bodies. He also evolved machinery for making brads and files and for cutting and heading tacks of different sizes.

An interesting feature of the exhibit is one of Boyden's business cards of about the year 1838. This card announces that he was prepared to make tools and supplies for coach makers, platers, gunsmiths, cutlers and locksmiths, under which were several headings of less known tools and equipment. The card also stated that he could furnish machinists with wrenches, screws, tools parts of spinning, weaving and other machinery, and would do leather work for the general trade. In his later life he turned his attention to agriculture and succeeded in raising strawberries which averaged five to a quart. He is also attributed with having said, when he was an old man, that if he were to try to make practical use of all the ideas he still had in his head it would take him another lifetime. The citizens of Newark in 1890 erected a statue of Boyden in Military Park, depicting him as a blacksmith contemplating a model of a locomotive. This is said to be the only statue ever erected to a blacksmith.

The Hamilton Iron & Steel Company.—Final steps in the reorganization plans of this company were taken November 6, when Frank L. Perin of Cincinnati was elected president, succeeding J. L. Pearson, and J. H. Bartow, president of the Lake Erie Ore Company, was made a director, taking Mr. Pearson's place in the board. A contract placed for ore calls for 118,000 tons, which is calculated to last until navigation opens, and this is being delivered at the rate of about 1500 tons daily. The furnace is to be put into blast about November 15 on foundry iron. A casting machine is to be installed, which is expected to be ready within four months, and with this the company will extend its operations to include basic in the output.

A large Snow gas engine is about to be tested in the power house at the Ohio Works of the Carnegie Steel Company at Youngstown, Ohio. It will be operated by gas from the blast furnaces. Three additional Snow engines are to be installed as soon as delivered, and will be operated in the same manner. Nos. 5 and 6 blast furnaces at the Ohio Works are now being operated by gas supplied by Nos. 1, 2 3 and 4 blast furnaces. Tod gas blowing engines are used exclusively in the blast furnace department—five in all.

Gas Producer Tests.

The United States Geological Survey, through its Technologic branch, has just issued a bulletin entitled "Incidental Problems in Gas Producer Tests," by R. H. Fernald, C. D. Smith, J. K. Clement and R. A. Grine. The survey is studying the general problems involved in the economic use of fuels in gas producers as part of its investigation of methods of increasing the efficiency of the fuel resources of the country. The bulletin declares that one of the important problems is the determination, under practically constant conditions, of the duration of gas producer tests necessary to reduce the possible error to a minimum. A greater part of the bulletin is therefore taken up with a discussion of the proper length of test period. Mr. Fernald, the consulting engineer in charge of these tests, has the following to say on this subject:

"Some of the test results reported by certain gas producer manufacturers are so absurd that no careful purchaser will be deceived; but, unfortunately, the alluring guaranties and special inducements regarding the cost of the installation have caught enough unwary buyers to injure seriously the business of reputable concerns. It is not uncommon to pick up advertising material that states a fuel consumption per horsepower per hour based on tests of two or three hours' duration only, in which the total coal charged during that period was from 20 to 30 lb. The producers in such tests are of course of small sizes, but the principle is the same for all.

"The initial fuel bed built up before the test is started amounts to several times the quantity of fuel charged during short interval tests, and the amount of gas that may be drawn from this foundation bed is an unknown quantity. It may be very small or may reach a large percentage of the total gas used during short tests, depending on the carelessness or cleverness of the superintendent of the test.

"Of course the claim is made that at the end of the test the fuel bed is always brought to the same condition that it was in the beginning, but experience in this direction need not be great to show that such conditions are practically impossible in tests of short duration. The error introduced by such an assumption may be sufficiently great to make the record results absurd. In fact, the percentage of possible error may be so large that it is only necessary to predetermine the desired fuel consumption per horsepower per hour and trust to the clever manipulation of the operator to secure that result. It is no wonder then that tests showing a consumption of only 0.6 lb. of coal per horsepower per hour are often reported; and apparently it is only necessary for some daring promoter to decide that a horsepower should be developed with a consumption of 0.25 lb. per hour for tests to be reported that show this figure.

"For accurate tests of gas producers and for a true determination of the fuel consumption either the conditions of the fuel bed at the beginning and at the end of the test must be positively known, or the test must be of sufficient duration to practically eliminate the uncertainties that arise from varying conditions of the bed. Inasmuch as the first method is usually out of the question, it is necessary to resort to the second, at the same time securing as uniform conditions as possible in the fuel bed."

Mr. Fernald summarizes the tests as follows: "That throughout a test the fuel bed should be maintained in uniform condition, with regard to both the character of the fire and the thickness of bed, but that, failing in this, special care should be exercised to see that the fuel bed is in the same condition and of the same thickness at the close of a complete test, or at the end of a test period, as at the beginning; that a test should never be started when the producer has been standing idle for some time with 'banked fires,' as the fuel bed will not be in the average condition under which it will be required to work during the test; that if, as the appointed hour for closing the test approaches, the fuel bed is not in proper condition, the time of closing the test should be postponed until the bed naturally assumes the proper thickness and character. No forcing of conditions should be allowed simply to bring the test to an end at a previously determined hour."

Pennsylvania Industrial Accidents.

HARRISBURG, PA., November 8, 1909.—In a special report to the State Secretary of Internal Affairs on accidents in the industrial establishments and mines of Pennsylvania during 1908, Chief John L. Rockey of the Bureau of Industrial Statistics, calls attention to the alarming increase in the number of nonfatal accidents. Fatal accidents were 1348, against 1422 the year before, but nonfatal accidents numbered 12,610, or twice as many as in 1907.

In the figures given, Mr. Rockey shows that 141 fatal accidents occurred in the iron and steel industry, against 1149 in the mines, but that 3944 men were hurt in iron and steel establishments as compared with 6531 in mines. The anthracite mines show 618 men killed and 3526 hurt, and the bituminous mines 531 killed and 3005 hurt.

The figures for the iron and steel accidents form an interesting contrast. Steel works lead with 61 killed and 1511 hurt; blast furnaces being next, with 47 fatal accidents and 374 of a nonfatal character, while rolling mills show 304 hurt and only 14 killed. Steel casting works show an even smaller proportion of fatal accidents, having but 5, while 311 were hurt. Car works and car wheel establishments showed 796 people hurt, but only 7 killed. Locomotive works also show a large number hurt, but none killed. The figures for accidents in such plants are 323. Other plants show these results: Tin plate mills, 5 hurt, none killed; edge tool works, 2 killed, 48 hurt; foundries and machine shops, 2 killed, 200 hurt; shovel works, 15 hurt, none killed; tin can factories, 57 hurt, none killed; wire and wire goods, 1 killed, and none reported hurt.

The report says in conclusion: "The need for more persistent care on the part of employee and employer is apparent. Many safeguards have been provided, but to avoid disaster there must be a purpose born of common sense not to take foolhardy risks or imprudently attempt to do things when they are surrounded by known elements of danger. More than half of the accidents here noted are chargeable to such causes." H.

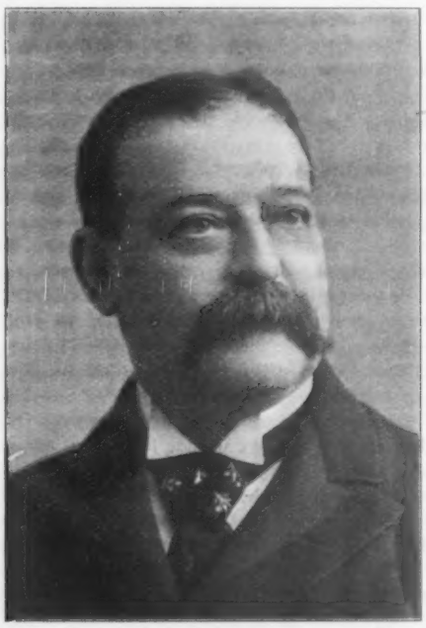
Illinois Coal Tests.—"Fuel Tests with Illinois Coal," issued as circular No. 3 of the Engineering Experiment Station of the University of Illinois, presents the results of an elaborate series of tests conducted at the fuel testing plant of the United States Geological Survey. The circular is compiled by L. P. Breckenridge and Paul Diserens. It deals only with coals taken from mines within the State of Illinois. The investigations described include steaming tests under boilers, gas producer tests, washing tests, coking tests, briquetting tests and tests to determine composition and heating value. From the results stated it appears (1) that the average calorific value of Illinois coal (ash and moisture free) is 14,319 B.t.u.; (2) that its evaporative efficiency is but slightly affected by the moisture it contains; (3) that its evaporative efficiency decreases as the ash and sulphur content increases, and that when burned in a hand-fired furnace its evaporative efficiency decreases as the amount of fine coal contained in it increases; (4) the performance of Illinois coal in a gas producer compares favorably with that of any other bituminous coal tested at the United States Geological Survey laboratory; (5) one-fourth of all the samples tested may be used for the manufacture of coke; (6) briquetting improves the evaporative efficiency of Illinois coals only when the raw coal is in the form of slack or screenings. Copies of this circular may be obtained gratis upon application to W. F. M. Goss, director of the Engineering Experiment Station, University of Illinois, Urbana, Ill.

The Mobile Pulley & Machine Works, Mobile, Ala., has a contract for the supply of castings for the Panama Canal. The company has recently opened a branch at New Orleans, La., under the name of the Transmission Machinery Company.

OBITUARY.

EDMUND HENDRICKS.

Edmund Hendricks, who was the senior member of the firm of Hendricks Brothers, dealers in metals and manufacturers of copper, with warehouses at 49 Cliff street, New York, and rolling mills at Soho, N. J., died October 27 at his home in New York City. Mr. Hendricks was 75 years old and had been actively identified with the metal trade for a period of over half a century. His death robbed the trade of one of its most prominent members. The business with which he was identified was founded in 1764 by his great-grandfather, whose sons established the rolling mills in Soho in 1813. Edmund Hendricks witnessed the most active developments in the metal industry in this country. He was educated in this city and immediately connected himself with the house established by his forefathers. The only



EDMUND HENDRICKS.

break in his business career occurred during the Civil War, when he went to the front with the Seventh Regiment in 1863. He later became a member of Lafayette Post, No. 140, G. A. R., and in after life took a great interest in the affairs of the Civil War veterans. He was a member of the Union, Lotos and New York clubs, American Museum of Art, Museum of Natural History, Chamber of Commerce and many prominent charitable organizations.

ALFRED CLEGG TAGGART, for many years chief engineer of the plant of the William Cramp & Sons Ship & Engine Building Company, Philadelphia, Pa., died suddenly November 1, from heart failure, aged 60 years. He was prominently known in the engineering field, having had charge of the erection of many important industrial plants. He leaves a widow and a son.

JOSEPH S. KNIGHT, president of the C. C. Knight Company, Philadelphia, Pa., died at his residence in Haverford, Pa., November 2, from typhoid fever, aged 37 years. Mr. Knight was well and favorably known in the iron and steel trades, having been long engaged with his father, the late Charles C. Knight, in the merchant iron business, and has been president of the company since its incorporation several years ago. He leaves a widow and four children.

A position is open on the staff of *The Iron Age* for a young man with some knowledge of the machinery trade and preferably with some experience in reporting. Address "Machinery Department," *The Iron Age*, 14 Park Place, New York, giving age, qualifications and references.

The First Blast Furnace to Make 100 Tons a Day.

The *Bulletin* of the American Iron and Steel Association gives some interesting blast furnace history in answering the question, When did a furnace in this country first make 100 tons of pig iron in 24 hours? From a publication of the association prepared in 1877, the *Bulletin* reproduces this paragraph: "As late as 1850 the furnace that would make 50 tons of pig iron a week with any kind of fuel was doing good work, now there are many furnaces in Pennsylvania that make that much iron in a day, while a few can make 75 tons a day as a regular product, and two—the Isabella and Lucy furnaces at Pittsburgh—have made over 100 tons a day for a week at a time." The first to make 100 tons of pig iron in a day was one of the Isabella furnaces, which reported 702 gross tons for one week in 1875.

In the association's report of the production of iron and steel in the United States in the census year 1880, published in 1881, a chapter was devoted to noteworthy achievements of iron and steel works, details being given of the best work of coke furnaces up to that time. In November, 1875, Isabella Furnace No. 2, 20 x 75 ft., made 770 tons in one week, its best day's work in that week being 116 tons. In November, 1878, a furnace of the Pennsylvania Steel Company, at Steelton, Pa., 20 x 75 ft., using one-third anthracite and two-thirds coke, made 2916 tons. In one week of that month the total was 725 tons, and the best day's record was 107 tons. One of Laughlin & Co.'s Eliza furnaces at Pittsburgh, 16 x 61 ft., in one day in 1880 made 130 gross tons of pig iron; in two consecutive days it made 253 tons. On March 28, 1880, Furnace A of the Edgar Thomson Steel Company, 13 x 65 ft., made 113 tons of iron, with a consumption of 1965 lb. of coke per ton and with ores yielding 54.02 per cent. Furnace B, 20 x 80 ft., made 208 tons November 22, 1880. Neshannock Furnace, at New Castle, Pa., 16 x 60 ft., made 679 tons of iron in one week in December, 1881, the best day's output being 114 tons. The furnace of the Low Moor Iron Company of Virginia, at Low Moor, Va., 18 x 75 ft., made 110 tons of iron October 8, 1881; 703 tons in the week ending October 8, 1881; and 2563 tons in September, 1881 from New River coal. The Riverside Furnace, at Wheeling, W. Va., 16½ x 75 ft., made 829 tons of iron in the week ending November 6, 1881. The best day's record was 122 tons. No. 1 Furnace of the Joliet Steel Company, at Joliet, Ill., 20 x 72 ft., made 126 tons of iron in one day in 1881; 788 tons in the week ending April 8, 1881, and 3276 tons in the month of April, 1881.

The Buckeye Rolling Mill Company, manufacturers of rerolled rails, with plant at Newark, Ohio, and office at Steubenville, Ohio, is installing new Rust water tube boilers of 600 hp. capacity, which will be ready for operation December 1. Other contemplated improvements include cooling beds, drills, &c., to increase the capacity of the plant about 50 per cent. After these additions are completed, and when running double time, the company will be able to produce 2000 to 2500 tons of rerolled rails, from 12 to 40 lb. per month. The company has issued a book of blue prints showing the dimensions of the rail sections which it makes.

The Automobile Insurance Company of America has been organized at Indianapolis, Ind., with $1,000,000 capital stock. D. M. Parry, former president of the National Association of Manufacturers, is at the head of the company. He is now a manufacturer of automobiles. The vice-president is L. N. Littauer, New York. Among the directors are James W. Van Cleave, St. Louis, president of the Buck's Stove and Range Company; Roger C. Sullivan, Chicago, president of the Great Lakes Dredge & Dock Company; W. B. Brinton, Dixon, Ill., president of the Detour Plow Company. It is said to be the pioneer in the field of exclusive automobile insurance. The company's headquarters will be at Indianapolis.

PERSONAL.

Samuel S. McCormick, hitherto secretary and treasurer of the C. C. Knight Company, Philadelphia, Pa., has been elected president, succeeding the late Joseph S. Knight, while Edwin L. Parry has been elected secretary and treasurer, succeeding Mr. McCormick. The business will be conducted under the same name and policy as heretofore.

Frank Samuel, iron and steel merchant, Philadelphia, Pa., returned November 6 from a month's business trip abroad.

Foster Milliken, 11 Broadway, New York, formerly president of Milliken Bros., Inc., who has been assistant to the receivers of the company, has severed that connection. He has been prominent in the structural steel trade for more than 25 years and many improvements in fabricating works practice and in the design of structural steel work are due to him. It is not his intention to withdraw from business activities, but his plans have not been definitely made.

John Duncan, formerly assistant general manager of sales of the National Tube Company, Pittsburgh, is now general manager of sales of the Wheeling Steel & Iron Company, Wheeling, W. Va., vice Henry G. Tinker, resigned. The appointment took place November 1. Mr. Tinker had filled the position for nearly 17 years and will take a much needed rest before resuming active business.

Announcement is made of the retirement from the advertising firm of Albert Frank & Co., Inc., 25 Broad street, New York, of Collin Armstrong, formerly a director and treasurer of the corporation. Mr. Armstrong has transferred his entire interest to James Rascover, president, who will hereafter be the sole active manager of the firm's financial and business affairs.

George J. Chandler has resigned as sales manager of the Sterling Steel Foundry, Pittsburgh, to become sales manager of the Braddock Machine & Mfg. Company, Braddock, Pa. The latter company has recently added an acid open hearth steel department to its plant.

Miles A. Hoffman, Sr., of Miles A. Hoffman & Co., 43-45 Great Tower street, London, E. C., who are manufacturers' representatives in hardware and allied lines, is visiting the trade in this country. He is making his headquarters at the Union League Club, Philadelphia, Pa.

George Westinghouse, president of the Westinghouse Electric & Mfg. Company, is to be the next president of the American Society of Mechanical Engineers.

The Iron & Steel Products Company, 80 Broadway, New York, announces that E. L. Harper, who has been temporarily assisting the president in connection with the purchase and sales department, has resigned, and that the vice-president, M. D. Chapman, will, until otherwise directed, be in charge of that department.

Robert Field, formerly Cincinnati representative of the Sloss-Sheffield interests, and more recently in charge of the pig iron department of the Cincinnati Iron & Steel Company, has been appointed manager of the Chicago office of Matthew Addy & Co., effective immediately. W. G. Murray, former manager of that office, has made a new connection with Walter-Wallingford & Co.'s Chicago office.

Peter Donaldson, of the pig iron firm of James Watson & Co., Glasgow, Scotland, and president and managing director of the Dayton Coal & Iron Company, Ltd., Dayton, Tenn., is now in this country.

C. M. Ohl has resigned as superintendent of the United Iron & Steel Company's Fannie Furnace at West Middlesex, Pa. P. J. Moran, superintendent of the Leetonia, Ohio, Furnace of the same company, will also have Fannie Furnace under his charge hereafter.

George F. McKay, who has resigned as traffic manager of the Lackawanna Steel Company, has become connected with the Pittsburgh firm of Edmund W. Mudge & Co., as manager of a new office opened in room 1008 Hudson Terminal Building, New York City. The business handled will be largely in iron ore, pig iron, coal and coke, foreign and domestic, and special attention will be given to the coal trade.

Automobile Prices May Be Higher.

The *Co-Operator*, published at Tarrytown, N. Y., where one of the plants of the Maxwell-Briscoe Motor Company is located, discourages those who are waiting for automobiles to be cheaper, when they expect to buy. Its views on this subject are as follows:

The demands of the automobile industry for raw materials have reached a point where the resources of allied industries have become inadequate. For some of the raw materials the demand has grown at a rate that has almost completely exhausted the visible supply, with the inevitable result that the prices of these commodities have soared to unaccustomed hights because of the strain imposed by the demand on a depleted market.

Take the item of rubber. We can still recall the time when crude Up-River Para gum could be bought in the open market at 35 cents a pound. Only about a year ago the price was well below the dollar mark. To-day crude rubber sells at $2.10, with no prospect of a decline and with an almost appalling scarcity of the material. Yet wheels must be shod with rubber tires and the automobile manufacturer is compelled to purchase his tire equipment at a much higher cost than was ever exacted of him before; the hey-day of the rubber pool arrangement pales into significance when the present-day price of rubber is considered.

The increase in the demand for special steels owing to the unusual requirements of the automobile industry is without parallel, again with the consequence that the 1909 prices of steels show a rise over the figures of 1908 of from 15 to 25 per cent. Here, too, the needs of the automobile industry have brought about a scarcity of raw material, so that it has become a matter of absolute fact that the automobile manufacturer is governed in his plans not by the amount of business he can command, but by the amount of raw material he is able to obtain.

It is unfortunate for the automobile industry that the increasing signs of general prosperity have not only brought increasing demands for raw materials from other quarters but are also responsible for new industrial combinations in various lines, which, by consolidating their interests, are able to maintain a high price for their productions of raw materials.

Not a bit less in importance than the condition of the raw material market is the present situation of the labor problem.

Nor are these conditions confined to the automobile manufacturer proper; they are also found in all establishments making the accessories forming part of the complete motor car. The scarcity of good labor and the difficulty of securing raw material also contribute to the reasons which make for increased prices in these lines.

Of course even this chaotic upheaval of resources will ultimately right itself, though relief is not in sight yet.

But it would be unwise for the public to expect the prices of cars to pursue a dowaward course at the same time when the price of nearly every part going into their manufacture keeps constantly rising. Indeed, it should be the cause for small wonder if the selling figures of automobiles were to accommodate themselves to the changing conditions under which the cars themselves must be made; in other words, we believe it very likely that not very long hence automobiles, instead of costing less, will cost more.

Ground has been broken for a new building to be erected by the Belle City Malleable Iron Company, Racine, Wis., to cost between $75,000 and $90,000. It will be 82 x 350 ft., of brick and steel, basement and three stories, and will contain a machine shop, shipping room, annealing room, pattern shop and new offices. On the Forest street site a power plant will be built of brick and steel, in which will be installed a 300-kw. generator. Upon the completion of the improvement the buildings of the company will cover an area of 400 x 480 ft.

Engine Building Seventy-Five Years Ago.

In an elaborate souvenir booklet with the title "Seventy-Five Years of Engine Building," the C. & G. Cooper Company, Mount Vernon, Ohio, gives a most interesting history of a typical manufacturing development in the Central West. The illustrations bring out in sharp contrast the old and the new products of the Mount Vernon plant. The original Cooper blowing engine was built in 1852. It had one steam cylinder and two air cylinders. The 18 x 72-in. steam cylinder was connected by means of a crosshead and wooden iron bound connecting rod to the main shaft, which drove the 48 x 72-in. blowing cylinders by means of gears. The engine was bolted to heavy wooden timbers, which, resting on the earth, formed the sole foundation. At 22 rev. per min. and 60-lb. steam pressure these engines developed 90 hp. and delivered air into the furnace at 3-lb. pressure. The average output of the furnaces then was 10 to 12 tons of iron in 24 hours. The latest blowing engines built by the company have compound steam cylinders and two air cylinders and are of the vertical disconnecting compound type. One of them furnishes blast for a modern stack, with a daily capacity of 500 tons of pig iron.

Of the other Cooper company products it is stated that the first Cooper Corliss engines built in 1869 are still running; that a special design of steam engine has been developed to meet the exacting requirements of rolling mill duty; that complete power plants are now designed and erected, including engines, boilers, piping system and auxiliaries complete, and, finally, that gas engines are now built of from 150 to 3000 hp.

An interesting reminiscence indicating the desperate handicaps under which manufacturing was conducted in the early days is reproduced in the words of Charles Cooper, one of the founders of the C. & G. Cooper Company, as written in September, 1874. We make the following extract:

> One day in 1833, while sitting on the hill overlooking the town [Zanesville], with the "blues," as seldom I have had, I saw the smoke curling up from the old Davis foundry. They used, as all foundries did then, an oven or air furnace for melting, with raw coal for fuel—hence the smoke. I was soon upon my feet and made directly for that concern, and I have never had "foundry" out of my mind since. We commenced immediately to make arrangements for building one. I sold one of my three horses for $50, and took one Brown's note payable in coal for that amount delivered at Zanesville. I sold that note to Cose & Co., paper mill men, and took their note for same payable in paper at wholesale. This note I took to Granville, Licking County, and traded to P. A. Taylor & Co., blast furnace men, for the bottom and staves for our first cupola to melt iron in. We moved from Zanesville here some time in November, hauling all we had on two wagons. The molding house was up, and the winter was spent in getting the horse power and cupola and other matters ready. The horse power was a primitive affair. There was a large wooden upright shaft, on the upper end of which was a bevel gear wheel, teeth and all of wood, no iron but the bolts. Think the pinion, too, was all of wood. You can now find the wheel in the bottom of the wall that is near the large brick chimney. It was used for a curb to build the wall on. We made the first melt late in April or early in May. We broke and carried up the iron, washed the ladles and charged the furnace all by hand. It took all the afternoon to make from 500 to 700 lb. of castings. We worked with the horse power until the fall of 1836, when we installed a small engine. It was a 6-in. bore and 24-in. stroke set on 6-in. timbers. The shaft was cast iron with a flange on the crank end. On this a cast iron crank was bolted and keyed. The pin was cast solid on the crank and filed up a little. It never saw a lathe. The boiler was an 18-ft. by 36-in. plain cylinder. At the same time we put in a cast iron blowing cylinder and commenced using coke, which we made ourselves in an old beehive oven, having used charcoal up to this time. We could now melt 1500 to 2000 lb. in one afternoon. We worked along this way for some little time. The year 1838 was a hard year, after the panic of '37, and all this time we were struggling to buy iron to keep the works going. We could borrow but little money, and that at 3 per cent. interest per month, but by hard work we got to going somewhat well again in 1839.

The *Hawaiian Planters' Monthly* of Honolulu announces that the three new sugar mills erected in Formosa by the Honolulu Iron Works Company last year have averaged an output of sugar equal to 11½ per cent. on the cane crushed, while the four new factories erected in Formosa by European machinery concerns produced less than 10 per cent. The favorable showing made has already brought orders to the Honolulu concern for two new mills, with probably more to follow.

Southern Iron & Steel Company Progress.

Several English capitalists interested in the Southern Iron & Steel Company spent two days last week inspecting the plants and properties of the company in Alabama, and were much pleased with the progress made in the operation of iron and coal mines and blast furnaces and the improvements underway. In the party were Cecil Grenfell of the banking house of Rothschild, London; Ernest H. Schiff and John Robertson, London; W. W. Miller, an attorney of New York; R. B. Van Cortlandt of Kean, Van Cortlandt & Co., New York, and A. W. Thompson, president of the Inland Steel Company, Indiana Harbor, Ind., Both the Ella Furnace, at Trussville, Ala., and Chattanooga Furnace, at Chattanooga, Tenn., are now in operation, the former having been blown in October 12 and the latter October 26. Extensive improvements have been made to both plants. Ella Furnace has produced 220 tons of iron in one day, which is considered good for that stack. The Chattanooga Furnace has averaged 180 tons a day, and this will be increased to 200 tons. The brown ore properties which the company has extensively developed are making a satisfactory output and a good quality of foundry iron is produced from this ore.

The great work the company now has under way is in connection with its plants at Alabama City, near Gadsden. The blast furnace is being improved so as to equal any in the district, and expenditures are being made on the steel plant so that it will have a maximum output at minimum cost. The originally reported removal of the Ensley plant to Alabama City will in reality mean simply the taking to the new site of such material and equipment as can be used to good advantage, the balance being scrapped. The building of new rod and wire mills at Alabama City is making rapid progress. The foundations are now in, concrete wall construction is far advanced and work on the superstructure has begun.

The Society of Naval Architects and Marine Engineers.

The seventeenth general meeting of the Society of Naval Architects and Marine Engineers will be held in Assembly Room 1, Engineering Societies Building, 29 West Thirty-ninth street, New York, Thursday and Friday, November 18 and 19, 1909, and will begin at 10 a.m. each day. There will be a banquet in Delmonico's large hall at 7 p.m. November 19, to which all members and their guests are cordially invited; tickets are $5 each, and seats can be engaged in advance or at the meeting. The Council will meet at 3 p.m. November 17, in Room 716, Engineering Societies Building. The papers expected to be read during the meeting are as follows:

Thursday, November 18.

"Evolution of Screw Propulsion in the United States," by Charles H. Cramp.

"The Effect of Parallel Middle Body Upon Resistance," by Naval Constructor D. W. Taylor, U. S. N.

"The Influence of the Position of the Midship Section on the Resistance of Some Types of Vessels," by Prof. H. C. Sadler.

"Some Ship-Shaped Stream Forms," by Assistant Naval Contractor Wm. McEntee, U. S. N.

"Applications of Electricity to the Propulsion of Naval Vessels," by W. L. R. Emmet.

"The Producer Gas Boat Marenging," by H. L. Aldrich.

"Building and Equipping Non-Magnetic Auxiliary Yacht Carnegie with Producer Gas Propelling Equipment," by Wallace Downey.

Friday, November 19.

"The Design of Submarines," by Marley F. Hay.

"The Foreign Trade Merchant Marine of the United States. Can It Be Revived?" by George W. Dickie.

"Material Handling Arrangements for Vessels on the Great Lakes," by Alexander E. Brown.

"Structural Rules for Ships," by James Donald.

"Rivets in Tension," by Robert Curr.

"The Strength of Watertight Bulkheads," by Prof. William Hovgaard.

"Cruising Motor Boats," by E. T. Keyser.

NEWS OF THE WORKS.

Iron and Steel.

One of the Thomas Iron Company's, Lock Ridge, blast furnaces at Alburtis, Pa., which has been idle for many months, is being made ready for blast. With its starting up all of the company's nine furnaces will be active.

The sale of the Passaic Steel Company's plant at Paterson, N. J., has been postponed from November 12 to November 19, in order to comply with certain legal requirements.

Marshall Furnace of the Juniata Foundry & Machine Company, Newport, Pa., is again in blast. It had been inactive since April 20, 1909.

Keystone Furnace of the Reading Iron Company, Reading, Pa., was blown in October 16.

All the blast furnaces in the Pittsburgh District were in blast November 1. No. 7, Carrie, which had been out for some weeks for repairs, was blown in October 8.

The eight furnaces of the Cambria Steel Company, Johnstown, Pa., were all in blast November 1. One furnace, which had been out for a few weeks for repairs, was started early in October.

One Bird Coleman furnace of the Lackawanna Iron & Steel Company at Cornwall, Pa., was blown in October 23. The other Bird Coleman stack is now being made ready for blast.

Two furnaces of the Virginia Iron, Coal & Coke Company were blown in last week: Radford Crane Furnace, Radford, Va., on November 1, and Crozer Furnace, Roanoke, Va., November 3.

The West End Furnace Company's stack at Roanoke, Va., was blown in October 18, after having been idle for several months.

The furnace of the Norton Iron Works, Inc., Ashland, Ky., was blown in October 3.

The Wheeling Steel & Iron Company, Wheeling, W. Va., had three furnaces in blast throughout the month of October, the Belmont Furnace having been blown in October 1.

One Calumet furnace of the Wisconsin Steel Company, South Chicago, Ill., was blown out for repairs October 31.

Furnace A of the Federal Furnace Company, at South Chicago, Ill., was blown out October 20.

One furnace of the Northwestern Iron Company, Mayville, Wis., was blown out for relining October 31.

Both the coke iron furnaces in Texas were active November 1, Jefferson Furnace, at Jefferson, having been blown in October 18, and Sam Lanham Furnace, at Rusk, October 11.

The Princess Furnace Company will rebuild its blast furnace at Glen Wilton, Va., erecting an additional stove and installing 500 hp. of boilers. Ladd & Baker, Inc., Real Estate Trust Building, Philadelphia, Pa., are the engineers.

The Sloss-Sheffield Steel & Iron Company is preparing for blast its one idle stack, that at Florence, Ala. When it goes in one of the furnaces at Birmingham will be put out for relining.

General Machinery.

The Frick Company, Waynesboro, Pa., has awarded contract for the structural steel for its new building to the Belmont Iron Works, Philadelphia, Pa. The new building will be of brick and steel construction, the larger part, 100 x 110 ft., to be used as a pipe shop, and the higher part, 32 x 110 ft., to be used as an extension to one of the erecting shops. In the latter will be posts and craneway to extend craneway of present erecting shop. Contracts have been let for practically all the material for this building.

The Wichita Mfg. Company, Wichita, Kan., is making a number of improvements to its plant, including the erection of a new foundry which is in course of construction. Plans are being prepared for the erection of a machine shop, which will considerably increase the capacity of the machine shop now occupied, the latter being 60 x 100 ft., two stories and basement. The buildings will be of manufactured stone and of modern construction. When they are completed the company will occupy more than one-quarter of a city block and its present capacity will be doubled.

The United Steam Pump Company, Battle Creek, Mich., is receiving bids for a two-story brick and steel machine shop, 90 x 320 ft., and a two-story office building, 50 x 65 ft., which will be erected at once.

A 10-in. centrifugal pump is required by the Milton Mfg. Company, Milton, Pa.

A gyratory rock breaker, with auxiliary apparatus, will be installed by the San Gabriel River Rock Company, Monrovia, Cal.

Repair shops, with machine tools and power equipment, costing $30,000, will be built by the Seattle, Renton & Southern Railway at Columbia Station, Wash.

A powerful ore crusher of the jaw type will be installed at the works of the Lake Superior Iron & Chemical Company, Newberry, Mich. The company's main office is in Detroit.

The Wooster Machine Company, Wooster, Ohio, which was recently consolidated with the Davis Clutch Company of Cleveland, has about completed the erection of the machinery in its new location and is busy getting out orders which are somewhat behind because of the insufficient facilities it had in its Cleveland shops. The company will make a specialty of gas engine pulleys, clutch pulleys and cut-off couplings, besides doing a general foundry and machine shop business.

A deep well pump driven by gasoline engine will be installed by the municipality at Carl Junction, Mo.

Some new tools and other equipment will be needed before long by the Great Northern Railroad at Great Falls, Mont., where the maintenance and repair department will be enlarged.

A line of induction motors for alternating current is to be added to the shop equipment of the Toledo Motor Company, Toledo, Ohio.

The H. J. Martin Forging Company, Indianapolis, Ind., has awarded the contract for a one-story factory building, 125 x 200 ft., the estimated cost of which is $20,000.

The Vulcan Steam Forging Company, Buffalo, N. Y., manufacturer of marine forgings, chrome nickel steel forgings for automobiles and other lines of medium sized smooth forgings, has secured additional land adjoining its plant on Rano street and the Delaware, Lackawanna & Western Railroad, and is preparing plans for doubling the capacity of the plant.

The Tichener-Culver Iron Company, which is to erect a new foundry to cost about $4300, is located at Oneonta, N. Y., instead of Binghamton, as was previously mentioned.

An addition 100 ft. long will be made to the car repair and maintenance shops of the Chicago, Milwaukee & St. Paul Railroad at Aberdeen, S. D.

The Buffalo Foundry & Machinery Company, Buffalo, N. Y., has completed plans for the erection of an extensive machine shop, one and two stories, 100 x 310 ft., steel frame, expanded metal and concrete construction, at its plant, East Ferry street and the New York Central Railroad Belt Line. Details of the machinery equipment to be installed have not yet been decided upon.

Foundries.

The recent item in these columns concerning the Atha Steel Casting Company, Newark, N. J., was in error. The addition to its plant has been completed.

Chas. Peters & Son., Ironton, Ohio, are said to contemplate the building of iron works at Springfield, Ohio.

The Frankfort Brass Mfg. Company has been incorporated at Frankfort, Ind., with $25,000 capital stock, to operate a foundry. The directors are J. A. Johnson, G. A. Burgess, G. L. Wire and F. L. Tuttle.

The Decatur Foundry, Furnace & Machine Company, Decatur, Ind., has been incorporated with $20,000 capital stock, to manufacture stoves, castings, machines and repairs. The directors are J. S. Bowers, Dyomis Schmidt and Erastus Fritzinger.

The American Cast Iron Pipe Company, Birmingham, Ala., has contracts for supplying water pipe to the following cities: Temple, Texas; Memphis, Tenn.; Salt Lake City, Utah; Holdenville and Oklahoma City, Okla.; Tuscaloosa, Ala.; Portland, Ore.; Lincoln, Neb., and Seattle, Wash.

The Buffalo Foundry Supply Company has been incorporated at Buffalo, N. Y., with a capital stock of $20,000, to take over the business and manufacturing plant of the unincorporated company of the same name, and will continue the manufacture of foundry facings, core washes and other foundry supplies.

Power Plant Equipment.

An electric power unit of 400 hp., with exciter and other auxiliary apparatus, is required by the Buckeye Mining & Smelting Company, Big Pine, Cal. The prime mover will be an impulse turbine.

Boilers and a pumping engine will be purchased next week for Ft. Hancock, N. J.

One or more hydraulic power plants of large capacity, to furnish electric current for industrial works, will be built on the Savannah River by the Interstate Power Company, Elberton, Ga.

The installation of a hydraulic power unit is contemplated by the Municipal Board at Granite Falls, Minn.

A dynamo of 250 kw., with auxiliary machinery, is to be placed in the electric power station of the University of Illinois, Urbana, Ill.

Complete power plant equipment, consisting of boiler, pump, feed water heater, engine, generator, exciter, &c., will be purchased by December 1 by the city of Waverly, Kan., for the municipal lighting plant.

A hydro-electric power station will be built this winter by the Citizens' Electric Light & Power Company, Thurmont, Md.

A pumping unit will be purchased before spring by the authorities of Mediapolis, Iowa.

Power machinery, condensers, pumps and electrical apparatus are to be purchased by the Springfield Light, Heat & Power Company, Springfield, Ohio. Some contracts for the new electric generating station to be built this winter have been let.

A centrifugal pump, direct coupled to induction motor, will

be installed for circulating feed water at the plant of the Dan River Power & Mfg. Company, Danville, Va.

A power plant is to be built in or near Madison, Ind., and two or three substations, with rotaries, transformers, &c., erected by the Cincinnati, Madison & Western Traction Company, Madison, Ind., unless the 1200-volt direct current system is adopted, when only the generating station will be required. No purchases of machinery will be made for some months.

Steam boilers and motor driven blowers for refuse disposal system will be among the requirements of the Traverse City Refrigerator Company for a new plant to be built at Traverse City, Mich.

A steam turbine power plant of large capacity is being planned by the Peoria Railway Terminal Company, Peoria, Ill.

A steel viaduct, electric power station and 10 miles of track will be built by the Wm. H. Smith Company, Somerville, Mass., for the Richmond & Henrico Railway Company, Richmond, Va.

Some new machinery will probably be required after January 1 for the municipal light plant at Naperville, Ill.

An electric power plant will be purchased by the Three States Lumber Company, Burdette, Ark.

A hydro-electric plant to develop about 5000 hp. will probably be built on the Tucannon River by the Spokane, Walla Walla & Western Railway, Dayton, Wash.

Williams Brothers, Limestone, Tenn., are in the market for a hydro-electric unit of about 100 hp.

The power plant of the Kirlin-Gray Electric Company, Watertown, S. D., has been sold to the Watertown Light & Power Company, which will replace the present equipment with new engine and generator. A producer gas plant may be installed.

The American Blower Company, Detroit, has sold a high-speed self-oiling engine, electric generator and switchboard to the National Construction Company, Texarkana, Kan.

Power transformers will be required by the Sierra & San Francisco Power Company, San Francisco, Cal., for new substations in the Visitaccon Valley.

One of the largest hydraulic power developments in the Southwest is to be undertaken by the Garland Power & Development Company, Little Rock, Ark., which will construct electric generating plants on the Ouachita River. Machinery requirements will not be determined upon until after the reservoir plans have been worked out.

The Stone & Webster Engineering Corporation has recently been intrusted with the purchase of machinery for a number of plants in the North and Southwest, including a steam turbine power station at Bellingham, Wash., and a hydro-electric plant below Nooksack Falls in that State.

The generating station of the Northern Colorado Power Company, Lafayette, Colo., is to be largely increased in capacity.

An electric power unit for lighting purposes will probably be required this winter by the Tennessee Cooperage Company, Hastings, Fla.

Pumping machinery will be bought shortly for a water system at Milford, Iowa.

While temporary arrangements may be made by the Weschester & Wilmington Railway Company, Wilmington, Del., to take power from an existing central station for the new line which it is building, a steam turbine station will probably be erected the coming year.

The Minneapolis Steel & Machinery Company has installed a Corliss engine, with 12-in. cylinder by 30-in. stroke, in the plant of the Marlin Pressed Brick Company, Marlin, Texas.

The Dixie Portland Cement Company, Richard City, Tenn., is making arrangements to operate machinery electrically, using direct current motors.

As evidence of the complete satisfaction that Angle compound high speed engines are giving, the American Engine Company, Bound Brook, N. J., reports orders for two 500-hp. Angle compound engines to be used for running centrifugal pumps of the Interborough Rapid Transit Company power plants. This order is the result of the good performance of similar engines installed earlier in the season. Bloomindale Brothers have installed a 400-hp. engine of the same type, and the three lighting units installed in the Belnord Apartments are now in continuous operation.

An electrically driven pump to deliver 1,500,000 gal. daily, 200-hp. engine and generator, air compressor and other machinery are to be installed in the municipal station at Quincy, Fla.

J. A. Martin, Terre Alta, W. Va., is having plans for a power house prepared and expects to purchase an electric generating unit in the near future.

Several power transformers of large capacity will be installed at various properties under the control of the Delaware, Lackawanna & Western Railroad.

A new boiler will be purchased by the authorities at Aurora, Minn., for the electric power and lighting plant.

One of the largest electric generating plants on the Western Reserve is to be installed by the Phœnix Light & Power Company, whose headquarters are at Maumee, Ohio. It will consist of units totaling about 3000 hp., with all accessory machinery, the dynamos to be driven by hydraulic turbines.

A Corliss engine or turbine power plant is being planned by the Indiana Northwestern Traction Company, Monticello, Ind. Construction work on the new road will begin at once, and the initial purchases of rails, line material, &c., will be made shortly.

Pumping and electric power machinery will be bought shortly for the municipal plant about to be erected at Ackerman, Miss.

An automatic four-valve engine of 125 hp., with electric generator and other power house machinery, will be bought by the Jefferson (Ga.) Cotton Mills Company.

Additional machinery is needed for the pumping station at Petersburg, Va.

Contracts for power equipment, rails, trolleys, steel posts, bonds, lightning arresters, &c., will be made next month by the Davenport & Manchester Interurban Railroad.

Walter O. Amsler, constructing engineer, Pittsburgh, has been awarded a contract for the erection of two Amsler gas producers, 9 ft. 6 in. in diameter, at the Southern Indiana Glass Company's works, Loogootee, Ind. He recently completed the construction of two producers for the company, which is arranging to operate the entire plant on producer gas.

Fires.

The Canada Iron Furnace Company's iron mining plant at Three Rivers, Quebec, was partially destroyed by fire November 7, the loss being about $50,000.

The plant of the John Pierce Stone Company, at Little Falls, near Utica, N. Y., was destroyed by fire November 7, the loss being about $100,000.

The Breece Mfg. Company's rim and spoke plant at Portsmouth, Ohio, was burned November 4. The loss is placed at $60,000.

The plant of the Commercial Iron Works, Penn Yan, N. Y., was recently burned with a loss of $15,000.

The plant of the Valley Machine Company, at Underwood, Iowa, was burned November 5, the loss being about $25,000.

Miscellaneous.

The Indiana Electric Transmission Company, Terre Haute, Ind., has issued $70,000 in bonds to secure money for installing a water works system in Jasonville, Ind.

F. W. Snyder & Co. have been incorporated at Vincennes, Ind., to manufacture agricultural implements, capital stock $15,000. The directors are Frank W. Snyder, Edward P. Bohe and Leroy Snyder.

The Spheroid Conveyor Company has been incorporated at New Albany, Ind., with $10,000 capital stock to manufacture a carrier system. The directors are Anton A. Leuke, Wm. H. McKay and Frank Leuke.

The Electric Supply & Fixture Company has been incorporated at Fort Wayne, Ind., with $25,000 capital stock to manufacture electrical supplies. The directors are Samuel M. Foster, Fred H. McCulloch and Howard L. Saylor.

The Columbus Brass Company, Columbus, Ohio, has purchased an existing plant in that city and is now equipping it for the manufacture of the Columbus all-metal tank. The company's new building represents an investment of about $40,000.

The Shannon Engineering & Contracting Company, House Building, Pittsburgh, has received a contract to furnish the Ellsworth Collieries Company, Ellsworth, Pa., with a tipple track for its new No. 2 steel tipple, and is also furnishing the filtration plant of the city of Pittsburgh at Aspinwall, Pa., with a lot of wheel scraper trucks.

The Interlocking Nut & Bolt Company, Pittsburgh, R. A. Clark, president, has sent a second shipment of bolts equipped with the Clark nut bolt lock to the Michigan Central Railroad for use on the Canadian Southern Division.

In order to obtain more facilities for storage and construction purposes, the Westinghouse Electric & Mfg. Company has awarded a contract to the Dawson Construction Company for the erection of two new buildings to be erected at the eastern boundary of the East Pittsburgh works. One of them, to be used for the construction and storage of catenary overhead trolley work, will be known as the catenary construction building, 40 x 80 ft. The other will be for the storage of scrap material. It will be 70 x 126 ft. Both structures will be of steel, with corrugated iron roof and concrete walls.

The Standard Scale & Supply Company, Pittsburgh, operated its works at Beaver Falls, Pa., full time during the business depression, and at present is operating to full capacity in all departments. This company has just received a contract for furnishing a large number of suspension scales for the custom service of the Treasury Department, which are to be placed on the docks at New York and Boston for the automatic weighing, as well as the recording of the weights of sugar. Orders received by this concern for its various types of scales from railroads, manufacturing and mining interests are steadily expanding.

The General Fire Proofing Company, Youngstown, Ohio, has been awarded a contract for the steel furniture for the new court house in New Orleans, La., amounting to about $42,600.

The Dean Forging Company has been organized at Muncie, Ind., and incorporated with $50,000 capital stock, to manufacture drop forgings, tools, castings, &c. The directors are J. Judson Dean, Mary M. Dean and C. K. Church.

The Stewart Jail Works Company, Cincinnati, was awarded the contract for the new county jail at Bloomfield, Ind., its bid being $28,000. The plans were drawn by Herbert L. Bass & Co., of Indianapolis, Ind.

Construction by the city of a pumphouse and water supply system is being considered at Amite City, La.

A gasoline engine driven pump will probably be purchased for the water works recently authorized for construction at Holdingford, Minn.

Ten additional stamps for crushing ore are to be purchased by the Long Valley Mines Company, Greenville, Cal.

Improvements to the water works, involving an expenditure of $35,000, will be undertaken this winter at Marshall, Texas, a bond issue having been voted for the purpose.

A pumping unit for water works service will be required in the near future by Springville, Utah.

New water works, with probable use of electrically driven pumps, will be considered by the authorities at Galesburg, Ill.

Mechanical filtration, with works and machinery to cost $75.000 or more, has been decided upon by the board at New Kensington, Pa.

The works of the Pitcher Lead Company, near Joplin, Mo., will be doubled in capacity, requiring the installation of additional machinery in both the new and old parts of the plant.

The sheet metal plant of R. S. Wishart, Minneapolis, Minn., is being enlarged and some new tools will be installed.

The St. Lawrence Pyrites Company, Hermon, N. Y., has decided upon the installation of additional apparatus for iron ore concentration.

The McKinnon Chain Company, Buffalo, N. Y., has recently purchased considerable equipment for its new machinery shop, including four shapers, five lathes, two planers, two milling machines, four drills, one radial drill, one universal grinder, cut-off saws and a number of smaller machines.

The Board of Water Commissioners, Quindaro, Kan., is having plans prepared for a pumping station 64 x 114 ft., which will cost $50,000.

The Kissel Motor Car Company, Hartford, Wis., states that it has contracted for all the equipment required for its new power plant It is the intention of the company to put in a sprinkling system, contract for which has not yet been placed.

The Michigan Copper & Brass Company, Detroit, Mich., is making arrangements for the erection of a large addition to its plant.

The Majestic Range Company, St. Louis, Mo., is having plans drawn for an addition to its factory which will cost approximately $15,000.

The Missouri Car Company, St. Louis, Mo., has let contract for the erection of a three-story factory building, 184 x 215 ft., to cost about $50,000.

The Columbia Steel Tank Company, Kansas City, Kan., which on October 16 suffered a loss by fire amounting to about $30,000, has erected two large tents on vacant ground adjacent to the burned factory, and will occupy these quarters temporarily until the burned buildings can be rebuilt. The company expects to have the new quarters ready within a month or six weeks.

The Elkhart Brass Mfg. Company, Elkhart, Ind., is having plans drawn for a new factory building, one story, 160 x 226 ft., to be built next year.

The Iowa Stove & Range Company, Waterloo, Iowa, whose plant was recently damaged by fire, advises that within the course of a week or 10 days the works will again be in full operation.

The Federal Tool & Supply Company, Alton, Ill., manufacturer of high grade hickory handles, whose factory was totally destroyed by fire on October 6, announces that it will rebuild shortly. The company will manufacture the same line as heretofore, in addition to which a general line of mill and mining supplies will be added. The company advises that it is able to fill orders from stock, as its warehouse was not included in the buildings burned.

The Colo Lighting Company, recently organized at Colo, Iowa, has acquired a power property known locally as the Carver plant, and will improve its machinery equipment.

Water works, with pumping plants of 2,000,000 to 10,000,000 gal. daily flow, will be constructed in the following Oklahoma cities: Woodward, Pryor, Chickasha and Grandfield. Each has been previously reported as under contemplation, but the necessary bonds have now been voted and work will be started this winter.

The United States Aluminum Company contemplates the erection of a plant at Clarksburg, W. Va. The equipment planned is said to include direct current generators, with extra wide commutators, and other apparatus for electrolytic refining, similar to the machinery at Massena, N. Y.

New Works of the McClintic-Marshall Construction Company.

The McClintic-Marshall Construction Company, Pittsburgh, with plants at Rankin, Pottstown and Carnegie, Pa., has bought from the Potter Palmer estate, Chicago, 50 acres of land at Indiana Harbor, Ind., on which it will erect bridge shops. It is a most eligible site for a structural plant, being near to and having direct rail connections with the plant of the Indiana Steel Company of the United States Steel Corporation at Gary, Ind., from which most of the plain material will be obtained. The plant will also have rail connections with the Pennsylvania lines West, Indiana Harbor Belt Railroad, New York Central, Michigan Central, and also by canal from Lake Michigan.

The initial capacity of the plant will be from 250 to 300 tons of fabricated material per day. It is to be erected to take care of the Western trade of the company. The preparation of plans for the new shops will be started at once, and the company later on will be in the market for a large line of lathes, planers, drill presses, boring mills and other iron working tools. When completed, which will be as speedily as possible, the new works, in connection with the present plants of the company at Rankin, Pottstown and Carnegie, Pa., will give the McClintic-Marshall Construction Company a total daily capacity of fabricated material of 750 to 800 tons.

The Carnegie Steel Company Will Build Large Finishing Mills at Girard, Ohio.

Plans have been under way for some time by the Carnegie Steel Company for the building of large finishing mills at Girard, near Youngstown, Ohio, and definite announcement of the building of these mills has just been made in an official statement issued by the company, which reads as follows:

The Carnegie Steel Company has purchased a tract of land lying mainly on the opposite side of the river from the town of Girard, and consisting of about 265 acres, on which it will locate in the near future merchant bar mills having a capacity of 30,000 tons of finished bars per month. The proposed improvements at Girard will be connected with the Carnegie plants of Youngstown on the south side of the Mahoning River by the Baltimore & Ohio Railroad and additional facilities of transportation will be afforded by the proposed Youngstown & Northern Railroad when completed.

The new mills will be driven by electricity generated at the Ohio Works by four 2000-kw. high tension alternating current generators, the motive power being gas engines using surplus blast furnace gas. The power station for this purpose has been erected and the first unit has been delivered and is now being tried out. The finishing mills will be modern in every respect. It is expected that additions made from time to time will enable a bar tonnage aggregating 60,000 to 65,000 tons per month to be ultimately produced by the new plant. It is expected that the work of construction on the new plant will proceed without delay, and that a number of mills will be in operation during the year 1910.

The National Tube Company's Kewanee Products.—Catalogue H of the National Tube Company, issued recently, deals with the products of the Kewanee works of the company. It is a morocco bound volume of 470 pages, 5 x 7½ in., and is lavishly illustrated. The principal classes of products described are wrought pipe for steam, gas, water and air; cast, malleable iron and brass fittings; brass and iron body valves and cocks; radiators and coils, drive well points and well supplies. The catalogue gives an impressive idea of the great variety of products turned out at the Kewanee works, which are devoted to the fittings and specialties accompanying the manufacture of wrought pipes and tubes. While standard goods occupy the greater part of the catalogue, some of its most interesting pages are devoted to medium pressure, extra heavy and hydraulic and special tubular goods.

The Iron and Metal Trades

New Activity in Structural Steel.

Large Billet Shipments to Be Made from the East to the Central West.

While the buying pace of October is not maintained in all lines, pig iron and finished material markets are strong and the outlook is full of promise. The prorating of mill products among consumers is increasingly difficult, and nearly all mills are falling farther behind on deliveries. Perhaps never have steel manufacturers been more cautious about commitments for the future. While advances above the present level are deprecated by some producers, there is also the feeling that at the higher prices that may prevail next year the mills must be compensated as far as possible for the lack of profit in much of the business of 1909.

The structural steel trade which seemed a few weeks ago to be entering a quiet period has taken on new activity. A number of large projects have been put forward, and it is estimated that over 100,000 tons of steel work will be awarded before the end of the month. The contracts for the Fourth Avenue Subway in Brooklyn are about to be let and 28,000 to 35,000 tons of steel will be required, the amount depending on the provision of pipe galleries. Deliveries of steel will begin in the spring of 1910. The extension to the Whitehall Building, New York, is to be let, requiring 9500 tons, and next week bids go in for the St. Louis free bridge, 16,000 tons. The Central Railroad of Mexico is expected to contract for 15,000 to 20,000 tons of bridges. Indications are that railroad bridge building will contribute heavily to the fabricating works in 1910.

Rail buying keeps up. The Great Northern is reported to have taken 40,000 tons for next year and the New Haven's needs are put at 15,000 tons. An order for 20,000 tons additional for one of the Harriman lines has gone to the Tennessee mill.

The absence of sufficient rail business to employ Eastern mills for the balance of the year has resulted in a sale of 45,000 tons of Bessemer billets by a seaboard mill for shipment to the Central West. The transaction emphasizes the extreme scarcity of semi-finished steel in that section. In some cases the scheduled billet output for the early months of 1910 has had to be pro-rated, consumers being allotted only a portion of their expected requirements.

Announcement is also made that the Carnegie Steel Company will start its Bessemer steel plant at Homestead.

Bar orders continue to pour in upon the mills at a staggering rate. There is no longer any attempt to measure the sources of this demand; it has been simply overwhelming.

Structural and plate mills have made no gain on the accumulation of new business. In the past week four additional vessels have been placed with lake yards. In railroad equipment lines locomotive orders are the prominent feature.

Buying of cast iron pipe has developed strongly. One interest, it is reported, took contracts for 83 miles of pipe in a single day. For 15,000 tons for Brooklyn, N. Y., bids will be opened November 17.

Buying of pig iron keeps up, with activity more pronounced in the East than in the West. In Central territory malleable foundries have good inquiries out. In the East low phosphorus iron has been the feature, one sale of 6000 tons for delivery throughout 1910 being reported and others aggregating several thousand tons. In foundry iron the largest contract was for 13,000 tons for an Eastern railroad equipment company.

A large steel interest at Pittsburgh bought 20,000 tons of Bessemer iron this week for November, December and January delivery at $19, at Valley furnace. Its total reported purchases since August have been over 75,000 tons.

The imports of pig iron thus far arranged for amount to six or seven cargoes, one for Philadelphia having been closed in the week. British pig iron dealers now say that the business with this country promises to be inconsiderable. The impression grows that the ability of pig iron production on this side to take care of the demand, rather than the development abroad of demand sufficient to advance prices there above the exporting point, will be the deciding consideration.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type, Declines in Italics.

At date, one week, one month and one year previous.

	Nov. 10, 1909.	Nov. 3, 1909.	Oct. 13, 1909.	Nov. 11, 1908.
PIG IRON, Per Gross Ton:				
Foundry No. 2, standard, Philadelphia	**$19.00**	$19.00	$18.50	$17.00
Foundry No. 2, Southern, Cincinnati	17.75	17.75	17.75	15.75
Foundry No. 2, local, Chicago	19.00	19.00	19.00	16.85
Basic, delivered, eastern Pa.	**19.00**	19.00	18.00	16.00
Basic, Valley furnace	**17.25**	17.25	17.00	14.50
Bessemer, Pittsburgh	**19.90**	19.90	19.40	16.40
Gray forge, Pittsburgh	**17.15**	17.15	16.90	14.90
Lake Superior charcoal, Chicago	19.50	19.50	19.50	19.50
BILLETS, &c., Per Gross Ton:				
Bessemer billets, Pittsburgh	**27.00**	27.00	26.00	25.00
Forging billets, Pittsburgh	**31.00**	30.00	29.00	27.00
Open hearth billets, Philadelphia	**30.60**	30.60	28.60	26.20
Wire rods, Pittsburgh	**32.50**	32.00	32.00	33.00
Steel rails, heavy, at mill	28.00	28.00	28.00	28.00
OLD MATERIAL, Per Gross Ton:				
Steel rails, melting, Chicago	*17.25*	17.25	17.75	15.00
Steel rails, melting, Philadelphia	18.00	18.00	18.00	15.50
Iron rails, Chicago	20.50	20.50	20.50	18.00
Iron rails, Philadelphia	21.00	21.00	21.00	20.25
Car wheels, Chicago	**18.50**	18.50	18.25	15.25
Car wheels, Philadelphia	17.50	17.50	17.50	15.00
Heavy steel scrap, Pittsburgh	*17.50*	17.50	18.00	16.00
Heavy steel scrap, Chicago	*16.00*	16.00	16.50	14.50
Heavy steel scrap, Philadelphia	18.00	18.00	18.00	15.50
FINISHED IRON AND STEEL, Per Pound:	Cents.	Cents.	Cents.	Cents.
Refined iron bars, Philadelphia	**1.65**	1.62	1.57	1.45
Common iron bars, Chicago	**1.55**	1.55	1.50	1.50
Common iron bars, Pittsburgh	1.65	1.60	1.65	1.40
Steel bars, tidewater, New York	1.66	1.66	1.66	1.56
Steel bars, Pittsburgh	1.50	1.50	1.50	1.40
Tank plates, tidewater, New York	**1.71**	1.66	1.66	1.76
Tank plates, Pittsburgh	**1.55**	1.50	1.50	1.60
Beams, tidewater, New York	**1.71**	1.66	1.66	1.76
Beams, Pittsburgh	**1.55**	1.50	1.50	1.60
Angles, tidewater, New York	**1.71**	1.66	1.66	1.76
Angles, Pittsburgh	**1.55**	1.50	1.50	1.60
Skelp, grooved steel, Pittsburgh	**1.50**	1.45	1.45	1.45
Skelp, sheared steel, Pittsburgh	**1.60**	1.55	1.55	1.50
SHEETS, NAILS AND WIRE, Per Pound:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, Pittsburgh	2.30	2.30	2.30	2.50
Wire nails, Pittsburgh*	1.80	1.80	1.80	1.95
Cut nails, Pittsburgh	1.80	1.80	1.80	1.75
Barb wire, galv., Pittsburgh*	2.10	2.10	2.10	2.40
METALS, Per Pound:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York	**13.25**	13.25	13.00	14.75
Electrolytic copper, New York	**13.00**	12.87½	12.90	14.50
Spelter, New York	**6.30**	6.30	5.90	5.05
Spelter, St. Louis	**6.15**	6.10	5.75	4.90
Lead, New York	**4.40**	4.40	4.37½	4.42½
Lead, St. Louis	4.25	4.25	4.25	4.30
Tin, New York	**30.50**	30.40	30.25	30.75
Antimony, Hallett, New York	*8.25*	8.25	8.30	8.12½
Nickel, New York	45.00	45.00	45.00	45.00
Tin plate, 100 lb., New York	$3.74	$3.74	$3.74	$3.89

* These prices are for largest lots to jobbers.

Correction.—In the table of "A Comparison of Prices," in the issue of *The Iron Age* of October 21, the price of steel bars at Pittsburgh was given as 1.55c. This proves to have been an error, as viewed from the course followed in making up the prices for this table. That price was the extreme of the market, and it should have been 1.50c.

Prices of Finished Iron and Steel F.O.B. Pittsburgh.

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Paul, 32c.; St. Louis, 22½c.; New Orleans, 30c.; Birmingham, Ala., 45c. Rates to the Pacific Coast are 80c. on plates, structural shapes and sheets, No. 11 and heavier; 85c. on sheets, Nos. 12 to 16; 95c. on sheets, No. 16 and lighter; 65c. on wrought pipe and boiler tubes.

Structural Shapes.—I-beams and channels, 3 to 15 in., inclusive, 1.55c., net; I-beams over 15 in., 1.65c., net; H-beams over 8 in., 1.75c.; angles, 3 to 6 in., inclusive, ¼ in. and up, 1.60c., net; angles, over 6 in., 1.65c., net; angles, 3 x 3 in. and up, less than ¼ in., 1.75c., base, half extras, steel bar card; tees, 3 in. and up, 1.65c., net; zees, 3 in. and up, 1.60c., net; angles, channels and tees, under 3 in., 1.50c., base, plus 10c., half extras, steel bar card; deck beams and bulb angles, 1.80c., net; hand rail tees, 2.80c., net; checkered and corrugated plates, 2.80c., net.

Plates.—Tank plates, ¾ in. thick, 6¼ in. up to 100 in. wide, 1.55c. to 1.60c., base. Extras over this price are as follows:

Tank, ship and bridge quality, ¼-in. thick on edges, 100 in. wide, down to but not including 6 in. wide, is taken as base.

Steel plates up to 72 in. wide, inclusive, ordered 10.2 lb. per square foot, shall be considered ¼-in. plate. Steel plates over 72 in. wide must be ordered ¼-in. thick on edge, or not less than 11 lb. per square foot, to take base price. Steel plates over 72 in. wide, ordered less than 11 lb. per square foot down to the weight of 3-16-in. shall take the place of 3-16-in.

Percentages as to overweight on plates, whether ordered to gauge or weight, to be governed by the Association of American Steel Manufacturers' Standard Specifications.

Gauges under ¼-in. to and including 3-16-in. plates on thin edges	$0.10
Gauges under 3-16-in. to and including No. 8	.15
Gauges under No. 8 to and including No. 9	.25
All sketches (excepting straight taper plates varying not more than 4 in. in width at ends, narrowest end being not less than 30 in.)	.10
Complete circles	.20
Boiler and flange steel plates	.10
"A. B. M. A." and ordinary firebox steel plates	.20
Still bottom steel	.30
Marine steel	.40
Locomotive firebox steel	.50
Shell grade of steel is abandoned.	
For widths over 100 in. up to 110 in	.05
For widths over 110 in. up to 115 in	.10
For widths over 115 in. up to 120 in	.15
For widths over 120 in. up to 125 in	.25
For widths over 125 in. up to 130 in	.50
For widths over 130 in	1.00

TERMS.—Net cash 30 days. Pacific Coast base, 1.30c. f.o.b. Pittsburgh.

Sheets.—Minimium prices for mill shipments on sheets in carload and larger lots, on which jobbers charge the usual advances for small lots from store, are as follows: Blue annealed sheets, Nos. 3 to 8, 1.65c.; Nos. 9 and 10, 1.70c.; Nos. 11 and 12, 1.75c.; Nos. 13 and 14, 1.80c.; Nos. 15 and 16, 1.90c.; box annealed sheets, Nos. 17 to 21, 2.10c.; Nos. 22 to 24, 2.15c.; Nos. 25 and 26, 2.20c.; No. 27, 2.25c.; No. 28, 2.30c.; No. 29, 2.35c.; No. 30, 2.45c.; galvanized sheets, Nos. 13 and 14, 2.35c.; Nos. 15 and 16, 2.45c.; Nos. 17 to 21, 2.60c.; Nos. 22 to 24, 2.75c.; Nos. 25 and 26, 2.95c.; No. 27, 3.15c.; No. 28, 3.35c.; No. 29, 3.45c.; No. 30, 3.70c. Painted roofing sheets, No. 28, $1.60 per square. Galvanized roofing sheets, No. 28, $2.85 per square for 2½-in. corrugations.

Wrought Pipe.—Discounts on steel pipe, ¾ to 6 in., in carloads to the largest trade, are 80 and 5 per cent. off list, and on iron pipe, ¾ to 6 in., are 74 and 5 per cent. off list.

Boiler Tubes.—Regular discounts, effective from October 1, 1909, on steel and charcoal iron boiler tubes, are as follows:

	Steel.	Iron.
1 to 1¼ in.	49	43
1¾ to 2¼ in.	61	43
2½ in.	63	48
2¾ to 3 in.	69	55
6 to 13 in.	61	43

2½ in. and smaller, over 18 ft. long, 10 per cent. net extra.
2¾ in. and larger, over 22 ft. long, 10 per cent. net extra.

Wire Rods.—Bessemer, open hearth and chain rods, $32.50.

Steel Rivets.—Structural rivets, 2.05c., base; boiler rivets, 2.15c., base, subject to usual extras.

Chicago.

FISHER BUILDING, November 10, 1909.—(*By Telegraph.*)

New business for the week has centered chiefly in larger buying by the railroads. Orders from Western roads for standard rails, as noted elsewhere, amounted to 120,000 tons, of which 100,000 tons were booked for mills in this district. The urgent demand for track supplies has exhausted stocks and the current capacity of the mills. The bar iron mills are feeling the quickening impulse of this buying movement, and it is understood have taken orders recently from Western roads for some 10,000 tons for the remainder of this year and the first half of 1910; on the largest contract for delivery over the first half it is understood that 1.65c. was paid, this being a premium of $1 per ton over prices that can be done for the first quarter. Outside of railroad buying the volume of new business has been comparatively light. Practically all the regular buyers of bars and sheets have covered their requirements through the first quarter, and the mills are extremely reluctant to commit themselves any further ahead than the deliveries which buyers will obtain by giving specifications on current orders. One mill in this district continues to take bar business at 1.58c. and structural shapes and plates at 1.68c. from buyers who are willing to wait for delivery until specifications now in hand are worked out, but it is understood that all the other mills are asking 10 cents per 100 lb. more where the buyer is given any specific promise as to near delivery. The settled policy of the mills of discouraging speculative purchases, and the fact that large buyers are having no difficulty in getting deliveries now on specifications filed two or three months ago, have had much to do with the moderation in the demand of sellers for new contracts running through the first half or further. In wire products the specifications in recent months have been so heavy that the mills are all the way from one to 15 weeks behind in shipments. The manufacturing consumers of wire and rods are having considerable difficulty in getting deliveries to keep up with the remarkable demand for their products, and they have specified very heavily on contracts running into next year. Coke is in active demand and higher, with difficulty in getting satisfactory deliveries.

Pig Iron.—Sales of malleable Bessemer iron were closed the past week in this market amounting to 10,000 or 12,000 tons, divided among several malleable foundries, the largest lot being 3000 tons. There was also a sale of a round lot of low phosphorus iron to a Milwaukee interest for delivery through the first quarter. Aside from these transactions very little business of any consequence is reported. Buyers seem to show little interest in taking additional iron for the first quarter or first half, and current orders for spot iron have been lighter than usual. The market, however, has passed over a quiet week without losing any of the strength htretofore exhibited, and the leading sellers are even more confident of the future. A little spot Southern iron continues to come out from time to time at concessions from regular prices, but the quantity does not materially increase or decrease and consists almost entirely of resale iron. One of the leading Southern interests, which has been very liberal in the past in affording facilities for the storage of speculative iron, adopted a rule November 1 which is believed to be responsible for most of these offerings of spot iron. Holders of warrants for this iron are now expected to pay a storage charge of 5 cents per ton per month, which, with interest, would make a carrying charge of about 10 cents monthly per ton. This would have a natural effect of bringing on the market iron which might otherwise have been held for the prospect of higher prices. Many other conditions besides the demand from consumers are contributing to this strength of the market. Sales of iron during August, September and October for forward delivery were very heavy, making for many leading sales agencies the largest volume of business they had ever done in any three months, and in some cases breaking all records for single months. This, of course, could not continue and a dull season has been expected in the sales branch of business. Lately a shortage of labor has become a serious factor in the South, cases having been reported where officials and office men were taken out in the yard to load iron, and the shortage of cars offers difficulties which may reach an unknown magnitude in the near future. In the North many of the foundry interests have difficulty in getting enough men to keep up with orders. The open fall weather has encouraged building operations and other outside work which pay higher wages, and until winter sets in the labor difficulty will be serious, especially for malleable foundries in smaller outside cities. This peculiar combination of conditions has led both buyers and sellers to take a complacent view of the market. The following quotations are for November and December delivery, f.o.b. Chicago:

Lake Superior charcoal	$19.50 to $20.00
Northern coke foundry, No. 1	19.50 to 20.00
Northern coke foundry, No. 2	19.00 to 19.50
Northern coke foundry, No. 3	18.50 to 19.00
Northern Scotch, No. 1	19.00 to 19.50
Southern coke, No. 1	19.85 to 20.35
Southern coke, No. 2	19.35 to 19.85
Southern coke, No. 3	18.85 to 19.35
Southern coke, No. 4	18.35 to 18.85
Southern coke, No. 1 soft	19.85 to 20.35
Southern coke, No. 2 soft	19.35 to 19.85
Southern gray forge	17.85 to 18.35
Southern mottled	17.60 to 18.10
Malleable Bessemer	19.00 to 19.50
Standard Bessemer	21.40 to 21.90
Jackson Co. and Kentucky silvery, 6%	20.40 to 20.90
Jackson Co. and Kentucky silvery, 8%	21.40 to 21.90
Jackson Co. and Kentucky silvery, 10%	22.40 to 22.90

(*By Mail.*)

Billets.—Buyers in this market are dependent upon occasional offerings from Eastern mills, and there is no fixed market price that can be quoted for Chicago delivery. There is difficulty in getting prompt shipment from any source, as the local mills are short of steel for their own rolled products.

Rails and Track Supplies.—Orders for 100,000 tons of standard rails were taken by the leading interest here last week, about half Bessemer and half open hearth. In addition to this satisfactory volume of business for the week, an order for 20,000 tons for one of the Harriman lines went to the Tennessee Coal, Iron & Railroad Company. There was a decided improvement in the volume of orders for light rails for mines, logging roads and other enterprises. It is understood that a considerable amount of new business in standard rails is pending, and may be closed in the near future. The demand for track supplies continues heavy, as the railroads are making every effort to improve the condition of their roadbed before heavy weather sets in. Track bolts are quoted higher by local mills, and the demand for prompt shipment is so pressing that in some cases outside Western mills have obtained as high as 2.75c. We quote standard railroad spikes at 1.80c., base; track bolts and square nuts, 2.30c. to 2.50c., base, all in car lots, Chicago. Light rails, 40 to 45 lb., $26; 30 to 35 lb., $26.75; 16, 20 and 25 lb., $27; 12 lb., $28, Chicago, less 50c. a ton on lots of 500 tons and $1 a ton on lots over 500 tons.

Structural Material.—A fair tonnage of new fabricated material came out last week. The Worden-Allen Company, Milwauke, took contracts in Chicago for a new machine shop for the Allis-Chalmers Company at the Washtenaw avenue plant, which will require 330 tons of structural material, and a new mill for the Interstate Iron & Steel Company at East Chicago, which will require 134 tons. At Kansas City the contract for the new Live Stock Exchange Building, which will require 1590 tons, was let to the Kansas City Structural Steel Company. These are the only important transactions of the week on which reports are available, but it is understood that a fair volume of new business is pending. Specifications from railroads for bridge work have been very satisfactory. There is a large volume of inquiries for small lots of structural and fabricated material going into buildings of moderate size. The mills are so congested in deliveries that the minimum price which we quote is only available at one mill for deferred deliveries, other mills quoting 10c. per 100 lb. higher for prompt or more specific delivery. We quote plain material from mill, 1.68c. to 1.78c., Chicago; from store, 2c., Chicago.

Plates.—There is little change in the situation as regards deliveries. The orders from Western railroads for new cars have been light in recent weeks, and this has given the mills a little time to gain headway on the heavy volume of specifications which they have on their books. There is considerable buying from store by consumers who are in the market for small lots, but larger consumers have difficulty in arranging for their needs. One buyer recently placed an order for 5000 tons for delivery as soon as the mill can reach the specifications given, while another large lot for immediate use was placed with another mill at the same time at a price 10c. per 100 lb. higher. This transaction shows the difficulty confronting buyers who want anything like prompt deliveries. We quote mill prices at 1.68c. to 1.78c., Chicago; store prices, 2c., Chicago.

Sheets.—The market for sheets continues in a state of uncertainty, especially on galvanized sheets, on account of the difficulty in obtaining prices that will cover the cost of galvanizing in the present state of the spelter market. Eastern mills are doing some business with jobbers and other buyers in this market for the first quarter, but the local mill has little capacity open for current business. An advance in prices is contemplated in the near future by the local mill on the basis of $2 per ton on No. 28 black sheets and $4 per ton on No. 28 galvanized over current mill prices. We quote store prices on a basis of 2.85c. to 2.95c. for No. 28 black and 3.90c. to 4c. for No. 28 galvanized.

Bars.—New business has been relatively light, but the mills are all so far behind on their specifications that when a new buyer appears efforts are almost invariably made to induce him to place the business elsewhere, and only old customers receive serious attention for their needs. A lull in new buying is welcomed for the present, as it gives the mills an opportunity to make a little headway in catching up on specifications. Under present conditions nearly all the buyers who have specifications in are pressing for deliveries on account of the general fear of a shortage in steel and possible delay in getting shipments at the time which the mills now promise. This creates more or less congestion and hampers the mills in taking care of the consumptive needs of their customers. The bar iron market is strong and a large tonnage was sold recently at 1.65c. Hard bars from rerolled rails are also stronger, and the mills handling this business advise that 1.55c. is now the minimum. We quote steel bars at 1.58c. to 1.68c.; bar iron, 1.55c. to 1.60c.; hard steel bars, rolled from old rails, 1.55c. to 1.60c., all Chicago.

Merchant Pipe.—The merchant pipe trade is devoid of any special features, but there is a good volume of new business and specifications and conditions are very satisfactory from all points of view. Prices remain unchanged.

Boiler Tubes.—Jobbers are carrying large stocks which they purchased at the low level of prices last summer, and buyers are finding no difficulty in getting prompt shipments. The mills are doing a very satisfactory business and prices are comparatively steady.

Cast Iron Pipe.—The municipal authorities at Valentine, Neb., found that the lowest bids exceeded their available funds and have therefore decided upon readvertising. Considerable new business is pending for winter shipment. Kansas City, Kan., has advertised for 1000 tons of water pipe, and other municipalities throughout the West are preparing estimates. Current business for small lots is very satisfactory, making a large tonnage in the aggregate. We quote per net ton, Chicago, as follows: Water pipe, 4-in., $28.50; 6 to 12 in., $27.50; 16-in. and up, $26.50, with $1 extra for gas pipe.

Metals.—There has been a good volume of consumptive buying in the Chicago market the past week in copper and other metals. Casting copper is very strong at the price we quote. Desilverized and corroding lead are a little weaker, as considerable business was done recently with consumers, and it is believed their wants have been covered for some time. Tin is very strong on account of the advancing market in New York. We quote as follows: Casting copper, 13c.; lake, 13⅜c., in carloads, for prompt shipment; small lots, ¼c. to ⅜c. higher; pig tin, car lots, 31½c.; small lots, 33c.; lead, desilverized, 4.40c. to 4.50c. for 50-ton lots; corroding, 4.65c. to 4.75c., for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 6.30c. to 6.40c.; Cookson's antimony, 10⅜c., and other grades, 9¾c. to 10¼c.; sheet zinc is $8, f.o.b. La Salle, in car lots of 600-lb. casks. On old metals we quote: Copper wire, crucible shapes, 13¼c.; copper bottoms, 11½c.; copper clips, 12¼c.; red brass, 12c.; yellow brass, 9¼c.; light brass, 6¾c.; lead pipe, 4½c.; zinc, 5.25c.; pewter, No. 1, 23c.; tin foil, 25c.; block tin pipe, 27c.

Old Material.—For several weeks the market for iron and steel scrap has been in a relaxed condition, and a large tonnage has gone into the hands of consumers at concessions from the prices that prevailed a few weeks ago. In some lines a little strength has reappeared this week, especially in steel scrap. Rerolling rails are strong. Car axles are scarce and in good demand, and locomotive tires are $1 higher on buying by shovel manufacturers. Wrought grades of scrap have been weaker, and in some cases dealers have had difficulty in placing small lots on track. Melting steel seems to have reached bottom for the present around $16, as no sales have been reported below this figure. Busheling scrap is a little easier, as the mills are not seeking it so actively. The Chicago & Northwestern and the Chicago, Milwaukee & St. Paul, had lists of fair tonnage which closed last week, and the Illinois Central has a list of about 8000 tons to close this week, with a large tonnage in reserve on which private bids have been received. The following prices are per gross ton, f.o.b. Chicago:

Old iron rails	$21.00 to $21.50
Old steel rails, rerolling	18.00 to 18.50
Old steel rails, less than 3 ft.	17.25 to 17.75
Relaying rails, standard sections, subject to inspection	23.50 to 24.50
Old car wheels	18.50 to 19.00
Heavy melting steel scrap	16.00 to 16.50
Frogs, switches and guards, cut apart	16.00 to 16.50
Shoveling steel	15.50 to 16.00

The following quotations are per net ton:

Iron angles and splice bars	$18.00 to $18.50
Iron car axles	21.50 to 22.00
Steel car axles	20.50 to 21.00
No. 1 railroad wrought	15.50 to 16.00
No. 2 railroad wrought	14.50 to 15.00
Springs, knuckles and couplers	15.25 to 15.75
Locomotive tires, smooth	18.00 to 18.50
No. 1 dealers' forge	13.25 to 13.75
Steel axle turnings	11.75 to 12.25
Machine shop turnings	11.00 to 11.50
Cast and mixed borings	7.50 to 8.00
No. 1 busheling	13.25 to 13.75
No. 2 busheling	10.25 to 10.75
No. 1 boilers, cut to sheets and rings	11.50 to 12.00
No. 1 cast scrap	15.25 to 15.75
Stove plate and light cast scrap	13.00 to 13.50
Railroad malleable	15.25 to 15.75
Agricultural malleable	13.50 to 14.00
Pipes and flues	12.00 to 12.50

The Spring Valley Iron & Ore Company, Spring Valley, Wis., blew in its blast furnace November 6, and will make malleable Bessemer and foundry iron for the market.

Philadelphia.

PHILADELPHIA, PA., November 9, 1909.

The pig iron market has been rather quiet, although prices are very firm. Finished materials show increasing activity, and mills are taking considerable business for more extended delivery at the higher range of prices. The market throughout is decidedly strong; sellers generally have disposed of their output for the balance of the year and seem more inclined to accept business for early 1910 shipment, although few have yet fully opened order books for first half delivery. Some little contract business in certain lines is noted, but such transactions are usually confined to special customers. The continued activity of the railroads in placing orders for equipment has a very favorable impression on the trade, although there appears to be a disposition in some instances to enlarge on the business in sight. A rather quiet market is expected to prevail for a time in crude materials, buyers in this territory being pretty well covered for near future requirements, while sellers have little to offer for early delivery, and both interests are awaiting further developments. Steel billets continue active at unchanged prices. An advance of a tenth cent per pound in sheets is believed to be certain in the near future. Refined iron bars show a forward movement, leading makers quoting 1.60c., mill, for reasonably early deliveries.

Pig Iron.—There has been a decided lull in the buying movement, and it looks as if rather quiet conditions would prevail in this market for a time, particularly as far as foundry iron is concerned. Most sellers have taken all the tonnage required for near future delivery, and seem disposed to await developments before taking on further heavy contracts. The customary small lot business will, no doubt,

continue as usual. Here and there a few moderate lots have been sold for November-December shipment, as well as for delivery extending over into the first quarter of the year, but the aggregate volume shows a falling off. Prices, however, continue firm, and the undertone of the market is decidedly strong. Sales of moderate and small lots of No. 2 X foundry are reported for shipment over the next five months, at $19 to $19.50, delivered in buyers' yards in this vicinity, with moderate lots of lower grades at $18.50 to $19, delivered. Deliveries on old contracts are being freely taken, and it is believed that stocks are being accumulated in some melters' yards. Several fair sized lots of low grade iron have been taken by the cast iron pipe makers, who are still in the market, but it is reported that those irons have now been pretty well cleaned up. Somewhat greater activity is noted in Virginia foundry grades; sales of about 1500 tons of No. 2 X, in lots ranging from 100 to 300 tons, are reported by one seller, at $19 to $19.25, delivered in this territory, for shipment during the next three or four months, while one lot of 1000 tons and another of 500 tons are reported at prices which would equal about the same price had the delivery been at this point. Sales of off-grade iron to cast iron pipe makers are also reported. Several Virginia makers, however, hold No. 2 X foundry for first quarter shipment at somewhat higher prices; in fact, as high as $20, delivered in this territory, for either prompt or forward shipment, but no sales are reported on that basis. Southern iron is still inactive in this market, the present price at which these grades are held, being somewhat above the quotations for Northern brands, delivered in this vicinity. A better volume of business in charcoal iron is reported by some sellers, in lots ranging from 100 to 300 tons, and mostly for early delivery, prices for Lake Superior brands ranging close to $23, delivered in this vicinity. Forge iron has been more active, with more or less inquiry for that grade still before the trade, one consumer being in the market for 3000 tons. A sale of 6000 tons and another of 500 tons are reported. Leading producers have little iron to offer for early delivery, and prices appear to be firm at $17.75 to $18, delivered, with some producers naming even higher quotations. Basic iron has been inactive, no transactions being reported. Melters are well covered as far as this year's requirements are concerned, and a number are also pretty well covered for the first quarter. Quotations are firm at $19, delivered, at which figure some producers would accept business for either first or second quarter. Considerable activity continues in low phosphorus iron, and several round lots have been sold, some of which has been for delivery over the entire next year. One lot of 6000 tons is reported sold for the latter delivery, but lacks confirmation at this writing. Sales of some 5000 tons in the aggregate are announced, the bulk of which was for shipment outside this territory, at prices equal to $22.75 had the iron been delivered here. Several scattered lots of foreign low phosphorus have also been sold, delivered prices of which range somewhat lower than those for domestic brands. A little more interest is again being taken in the importation of Middlesbrough iron, particularly by the cast iron pipe makers, offerings having been made at about 50c. under the domestic market, but buyers do not seem to be ready to take hold at the present time. The strength of the domestic market is fully maintained, no weakness being shown in prices of any grade, although sellers, in some instances, appear to be about ready to extend deliveries somewhat, without any advance over the present price levels, which, for standard brands for delivery in buyers' yards, eastern Pennsylvania and nearby points, shipment extending up to the end of the first quarter, range about as follows:

Eastern Pennsylvania, No. 2 X foundry	$19.00 to $19.50
Eastern Pennsylvania, No. 2 plain	18.50 to 19.00
Virginia, No. 2 X foundry	19.00 to 19.25
Virginia, No. 2 plain	18.50 to 19.00
Gray forge	17.75 to 18.00
Basic	19.00
Low phosphorus	22.75 to 23.00

Ferromanganese.—The local market continues quiet, transactions being almost entirely in carload lots for prompt shipment at prices close to $45, Baltimore, although one seller reports materially higher figures, particularly for first half delivery. Sales of heavy tonnages for Western and Southern delivery at prices close to the above basis, for delivery during the entire next year, are reported; in this territory, however, not enough business has been transacted to make a market.

Billets.—Buying continues active, and the leading Eastern mill is now entirely sold up as far as this year's delivery is concerned. Inquiries are numerous, a considerable number coming from consumers west of Pittsburgh. Makers are not soliciting business, but are taking a good number of orders for early 1910 shipment. Consumption is evidently increasing, as shipments are being sharply urged by consumers. For ordinary rolling billets prices are firm at $30.60, delivered in this vicinity, with forging billets quoted at $32 to $33, delivered, the usual extras applying for high carbons and special sizes.

Plates.—There has been an increased demand, and some mills have entered contracts for moderate tonnages covering early 1910 requirements. Individual orders have been somewhat larger, one Eastern mill booking among others three separate 5000-ton lots, two of which were for plates for structural and bridge work, and the other was for tank plates. Increasing inquiry from Western consumers is noted, and several mills have reached the point where more time for delivery must be asked. Orders for first quarter shipment are being taken somewhat more freely, and prices are on a trifle more even basis, 1.75c. to 1.80c. being named for ordinary plates for either prompt or first quarter delivery in this territory.

Structural Material.—Orders for some fairly good sized building work have been placed during the week. The Bethlehem Steel Company announces orders for plain shapes for the Fidelity Building, Baltimore, Md., 3000 tons; Woodward Apartments and the Lacey Office Building, Washington, D. C., 600 tons each; building in Bristol, Pa., 350 tons; a garage in Baltimore, 200 tons, and a laundry building in Richmond, Va., 150 tons. Other makers as well as fabricators have taken on considerable work, and the market on the whole has a better appearance. Mills are still fully engaged, and prices for plain material, delivery in this territory, are firm at 1.75c. to 1.80c., dependent on specifications.

Sheets.—The demand for sheets is steadily increasing and mills have more business offered than they can conveniently handle. While prices for reasonable deliveries are unchanged, an advance of a tenth cent per pound is expected in the very near future. Sharp premiums continue to be obtained for prompt or future deliveries, and mills refuse, in some cases, to accept orders from other than regular customers. For reasonable deliveries in this territory the following range of prices is nominally quoted: Nos. 18 to 20, 2.50c.; Nos. 22 to 24, 2.60c.; Nos. 25 and 26, 2.70c.; No. 27, 2.80c.; No. 28, 2.90c.

Bars.—The scarcity in steel bars for early delivery has resulted in an increased volume of business coming to the iron bar mills, the majority of which are now pretty fully engaged. The tendency, however, is to accept business for near future delivery, rather than to enter contracts for extended shipment. Refined iron bars have, owing to the increased demand, advanced in price, the leading producers quoting 1.60c., mill, equal to 1.65c. to 1.75c., according to specifications, for delivery in this territory. Refined iron test bars are quoted at 1.70c., mill, at which price business has been freely done. Steel bars for prompt delivery are extremely scarce; makers quote 1.65c. to 1.70c., but cannot make satisfactory shipments.

Coke.—There is still a fairly good demand for both furnace and foundry coke, but the tonnages sold in this vicinity have been unimportant. Several sellers have advanced prices of foundry coke 10c. to 25c. a ton for early 1910 shipment, while prices of furnace coke are practically unchanged. For delivery during the remainder of this year and the first quarter foundry coke is quoted at $2.85 to $3.25 per net ton, at oven, dependent on grade, furnace coke quotations remaining close to $3, at oven, for the same delivery. For delivery in this vicinity for the remainder of the year the following quotations about represent the market:

Connellsville furnace coke	$5.00 to $5.25
Foundry coke	5.15 to 5.35
Mountain furnace coke	4.65 to 4.85
Foundry coke	4.75 to 5.00

Old Material.—Buying continues along rather narrow lines, although the market does not show the indications of weakness so noticeable last week. Prices on all grades are practically unchanged. Steel melters claim to be getting good supplies of heavy melting scrap at the present basis, $18, delivered at Eastern mill. Some movement in low phosphorus scrap is noted at a somewhat higher price level. Machinery cast is strong on good but scattered demand. Sales on the whole have been light, in some grades no transactions being reported. Prices, while to some extent nominal, range about as follows for prompt delivery in buyers' yards, eastern Pennsylvania and nearby points:

No. 1 steel scrap and crops	$18.00 to $18.25
Old steel rails, rerolling	19.50 to 20.00
Low phosphorus	23.00 to 23.50
Old steel axles	24.00 to 25.00
Old iron axles	30.00 to 31.00
Old iron rails	21.00 to 22.00
Old car wheels	17.50 to 18.00
Choice No. 1 R. R. wrought	21.00 to 21.50
Machinery cast	17.50 to 18.00
Railroad malleable	17.00 to 17.75
Wrought iron pipe	17.25 to 17.75
No. 1 forge fire scrap	16.50 to 17.00
No. 2 light iron	10.75 to 11.25
Wrought turnings	15.50 to 16.00
Stove plate	14.00 to 15.00
Cast borings	13.50 to 14.00
Grate bars	14.50 to 15.00

The E. B. Leaf Company, Philadelphia, Pa., which several years ago purchased the plant of the Elmira Steel Works, Elmira, N. Y., has decided to dismantle it. A large portion of the equipment will be sold as second-hand machinery; the remainder will be broken up and sold as scrap.

Cleveland.

CLEVELAND, OHIO, November 9, 1909.

The lake ore movement this season will break the 1907 record, provided that weather conditions are favorable for the next 30 days. Shipments in October reached 6,625,801 tons. This is a new record for the month, and the figures would have been considerably larger but for the loss of considerable time because of storms. The October shipments show a falling off of less than 400,000 tons as compared with September. The total ore movement by lake to November 1 was 36,265,334 tons. This is a falling off of 776,527 tons as compared with the movement to November 1, 1907. In 1907, however, shipments fell off rapidly after November 1. The total lake movement in 1907 was 41,288,755. To equal this record the ore fleet will have to bring down 5,023,421 tons between November 1 and the close of navigation. Ore reservations for next season are still being made. A heavy tonnage of Bessemer ores has been allotted and some consumers are now making reservations of non-Bessemer ores. No action has been taken as yet in advancing prices, but it is expected that merchant firms will formally announce the advance of 50 cents a ton the end of the month. The report of a sale of a round tonnage of Mesaba Bessemer to the Cambria Steel Company at this season's prices, which appeared in an Eastern publication, is declared to be without foundation. Little vessel tonnage has been chartered since the 10 cents advance in lake carrying charges. Shippers were pretty well covered before the advance was made and not much boat tonnage was available had there been a demand for it. The barges of the Pittsburgh Steamship Company have started on their last trip up the lakes and shipments will begin to fall off in a few days. Prices at Lake Erie docks, per gross ton, are as follows: Old Range Bessemer, $4.50; Mesaba Bessemer, $4.25; Old Range non-Bessemer, $3.70; Mesaba non-Bessemer, $3.50.

Pig Iron.—The market is quiet, but prices are firm, with no change in quotations. In foundry iron a number of sales for the first quarter and first half are reported, but they are all small lots, few running over 300 tons. Local furnaces refuse to shade their price of $18, at furnace, for No. 2 foundry for any delivery. In the Valley No. 2 foundry is quoted at $17.50 for the first quarter and half, the minimum price for the remainder of the year being $17.25. Nearly all the consumers in this territory are at least partially covered for their first half requirements, so that an active market is not expected for the next few weeks. The melt continues heavy and shipments are not being withheld. The market outside of this immediate territory appears a little more active. One local interest reports the sale of several lots, including one of 900 tons of malleable. This interest reports the receipt of three inquiries, aggregating 20,000 tons, for basic, malleable and foundry iron. For the balance of the year we quote, delivered, Cleveland, as follows:

Bessemer	$19.90
Northern foundry, No. 1	$18.65 to 18.90
Northern foundry, No. 2	18.15 to 18.40
Northern foundry, No. 3	17.65 to 17.90
Southern foundry, No. 2	19.35
Gray forge	17.15 to 17.40
Jackson County silvery, 8 per cent. silicon	20.55

Coke.—The demand for spot foundry coke has improved somewhat, and prices are a little firmer. We quote Connellsville 72-hour foundry coke at $3.10 to $3.40 per net ton, at oven, for prompt shipment, and $3.25 to $3.50 for delivery through the first half. Standard Connellsville furnace coke is held at $2.75 to $2.85 for spot shipment, and $2.85 to $2.95 for the first half.

Finished Iron and Steel.—Nearly all the mill agencies are declining to make contracts for steel bars, plates and structural material for delivery after the first of the year, following instructions to take on no more for future delivery until they catch up somewhat on present contracts. Some plate and shape tonnage has been contracted during the week at 1.60c., Pittsburgh, for delivery during the first half, but inquiries from consumers for contracts are less frequent than they were. Many consumers apparently have reached the conclusion that prices on finished lines will go no higher, and that they would gain no advantage by making contracts at present prices, were the mills disposed to take on the tonnage. Specifications on contracts continue heavy, and a fair amount of current business is coming out for which premium prices are paid if quick delivery is desired. Steel bars are quoted at 1.45c. to 1.50c., Pittsburgh, for forward delivery. The minimum price on plates and structural material is 1.60c., Pittsburgh, for forward delivery, and mills able to make prompt shipment have no trouble in getting $2 a ton over these prices. The demand for iron bars continues good, and prices are firm; we quote 1.65c., at Cleveland mill. The Lake Shore Railroad is in the market for its requirements of iron bars for the first half of next year, amounting to about 2000 tons. The demand for plates continues heavy, and deliveries show no improvement. The American Shipbuilding Company has placed an order with the leading interest for 6500 tons of plates and shapes for two new lake boats, for which contracts have just been placed. The Nickel Plate Railroad has given an order to the same interest for 3000 tons of rails for its next year's requirements. An Ohio railroad has contracted for 275 tons, and another Ohio road expects to close a contract in a few days for 3000 tons. There is considerable inquiry for billets for the first half of next year. The demand for forging billets in one or two car lots for early delivery is quite active, and consumers are paying $32, Eastern mill, equivalent to about $33.50, Pittsburgh, for prompt shipment.

Old Material.—The market is extremely dull and prices are weaker. With the exception of cast scrap, for which the demand continues quite good, practically no transactions are reported. Mills are well filled up and are refusing to buy for early delivery. Dealers are not inclined to sell for future delivery. The price of heavy melting steel has declined 50c. a ton, and while other quotations remain about stationary, dealers are compelled to make concessions to move scrap loaded on cars. The railroad lists offered last week brought only fair prices. Prices per gross ton, f.o.b. Cleveland, are as follows:

Old steel rails	$17.00 to $17.50
Old iron rails	20.50 to 21.00
Steel car axles	20.50 to 21.00
Old car wheels	17.50 to 18.00
Heavy melting steel	16.25 to 16.75
Relaying rails, 50 lb. and over	22.50 to 23.50
Agricultural malleable	15.00 to 15.50
Railroad malleable	17.00 to 17.50
Light bundled sheet scrap	11.50 to 12.00

The following prices are per net ton, f.o.b. Cleveland:

Iron car axles	$21.50 to $22.00
Cast borings	9.00 to 9.25
Iron and steel turnings and drillings	11.00 to 11.25
Steel axle turnings	12.00 to 12.50
No. 1 busheling	14.50 to 15.00
No. 1 railroad wrought	17.25 to 17.50
No. 1 cast	15.50 to 16.00
Stove plate	12.50 to 13.00
Bundled tin scrap	11.00 to 11.50

Buffalo.

BUFFALO, N. Y., November 9.

Pig Iron.—A good volume of new order tonnage has been booked the past week for foundry, forge and malleable grades, all lines of trade being fairly well represented in the placements. Contracts aggregating 15,000 tons from railroad equipment shops, for delivery over the first eight months of 1910, have come to Buffalo furnaces. One sale of 15,000 tons of basic was made for forward delivery by a Buffalo producer on a basis of $18.50, at furnace. Rail shipments from local furnaces are heavier, the closing of the Erie Canal throwing additional traffic on the railroads. The range of prices remains about the same as for the previous week. We quote as follows, per gross ton, f.o.b. Buffalo, for the remainder of the year and first quarter deliveries:

No. 1 X foundry	$17.00 to $17.50
No. 2 X foundry	16.75 to 17.25
No. 2 plain	16.50 to 17.00
No. 3 foundry	16.25 to 16.50
Gray forge	16.00 to 16.50
Malleable	17.50 to 18.00
Bessemer	19.00 to 19.50
Basic	18.25 to 18.75
Charcoal	20.25 to 21.00

Finished Iron and Steel.—The leading interest and most of the other mill agencies report a continued strong demand for all lines, although a few state that, while pressure is still being made for contracts for first quarter and half, there is a slight falling off in current inquiries, due largely to the crowded condition of the mills and their inability to promise specific deliveries. Inquiry for structural material has also slackened, owing to the approach of the close of the building season. Prices are firm. Steel bars are quoted by the leading interest at 1.45c., Pittsburgh; plates and shapes 1.60c., Pittsburgh, while other manufacturers are quoting a minimum of 1.50c., Pittsburgh, on bars and 1.60c. on plates and shapes. On cold rolled and cold drawn steel the price has been changed to a minimum of 55 per cent. discount for carload lots and 50 per cent. for less than carloads from the new list issued November 1. The leading interest reports the Canadian export trade continuing heavy, bridge material going forward in quantities for construction work on the Grand Trunk Pacific, Canadian Northern and Canadian Pacific railroads, and structural material for Toronto building operations. In the local structural market several new buildings are still to be figured on this fall. Bids will be received shortly for steel for the Buffalo Foundry & Machine Company's new machine shop, taking about 350 tons; steel for the new plant of the Standard Mirror Company, 80 x 300 ft., and also for Gleason & Co.'s factory building at Rochester, which will be erected next spring, requiring about 250 tons. The 2000 tons of reinforcing bars required for the new intake pipe line of the Ontario Power Company, Niagara Falls, Ont., has been placed with the Ontario Iron & Steel Company, Welland, Ont.

Old Material.—The scrap situation continues easy. Trade conditions are very quiet, with no large transactions.

as the principal consumers are well stocked. The temporary embargo against receipt of scrap at the Lackawanna Steel Company's plant continues and is owing partly to the fact that one large stock pile of scrap is being removed as fast as it can be used in current consumption to make room for new buildings, which supplies the needs of the open hearth furnaces for the time being. There has been no decline in the range of prices, which are generally held firmly to schedule, although in some few instances for movement of material on track to avoid demurrage charges prices have been shaded slightly. We quote as follows per gross ton, f.o.b. Buffalo, prices being nominal in some instances:

Heavy melting steel	$16.00 to $17.00
Low phosphorus steel	21.00 to 22.00
No. 1 railroad wrought	18.00 to 18.25
No. 1 railroad and machinery cast scrap	17.00 to 17.50
Old steel axles	20.50 to 21.00
Old iron axles	26.00 to 26.50
Old car wheels	18.00 to 18.50
Railroad malleable	17.00 to 17.50
Boiler plate	14.50 to 15.00
Locomotive grate bars	13.00 to 13.50
Pipe	14.00 to 14.50
Wrought iron and soft steel turnings	12.00 to 12.50
Clean cast iron borings	10.00 to 10.50
No. 1 busheling scrap	14.00 to 14.50

Birmingham.

BIRMINGHAM, ALA., November 8, 1909.

Pig Iron.—An unusually heavy movement from furnace yards to practically every line of the foundry trade continues. This is largely accounted for by the disposition of producing interests to adhere strictly to the agreement as to the delivery of all tonnage engaged at lower figures than are now being asked, and the efforts of melters to avail themselves of every opportunity to take out low priced iron. The actual demand for prompt shipments is light, and by reason of an increase in the tonnage offered for resale, which results from congestion on melters' yards, it is probable that the market value of spot deliveries is somewhat lower than at the time of last report. Several lots of 200 to 300 tons each are know to have changed hands the past week at lower figures than the $15, Birmingham, schedule, but none of the sales referred to have been traced to the furnace companies. For several comparatively small lots engaged within the week for shipment covering the first quarter, the $15 Birmingham basis has been received, and there is no reason to believe that in any case could deliveries after January 1 be had for lower figures. The inquiry just at this time is not indicative of trading to an appreciable extent in the immediate future for any delivery, yet the fact of approaching inventory time and the rate at which shipments are now being made are features worthy of consideration in a summary of conditions existing. The latest comparison of aggregate tonnage booked for first quarter delivery and the tonnage that will of necessity be carried over by the producers, with the probable make and stock on furnace yards, indicates that the majority of producers are very comfortably provided for during the first quarter, but as the result of having adhered closely to quotations established by the producing interests, the tonnage held by merchants has not moved recently at the same rate as the movement from furnace yards.

Cast Iron Pipe.—One or more fairly attractive tonnages of gas pipe are accredited local producers within the past week, but without the confirmation of such sales the week's business is reported as composed principally of small lots. The prices recently received are indicative of the maintenance of quotations as published, although a definite statement is not warranted as to the result of a round tonnage offer. Producers are apparently satisfied with the situation and are provided with orders for some months' operations. Without evidence to the contrary, we quote the market for water pipe, in such quantities as are in demand, firm at the following prices per net ton, f.o.b. cars here: 4 to 6 in., $26; 8 to 12 in., $25; over 12-in., average $24, with $1 per ton extra for gas pipe.

Old Material.—Following the lack of interest in pig iron for spot shipment, the market for old material is quiet. So far no reports are made of changes in prices, but where there is an accumulation of stock it is quite likely that lower figures are accepted than were asked at the time of last report. Dealers' asking prices are as follows, per gross ton, f.o.b. cars here:

Old iron axles	$20.50 to $21.00
Old iron rails	16.50 to 17.00
Old steel axles	19.00 to 19.50
No. 1 railroad wrought	14.50 to 15.00
No. 2 railroad wrought	12.00 to 12.50
No. 1 country wrought	12.00 to 12.50
No. 2 country wrought	11.50 to 12.00
No. 1 machinery	13.00 to 13.50
No. 1 steel	12.50 to 13.00
Tram car wheels	12.00 to 12.50
Standard car wheels	14.50 to 15.00
Light cast and stove plate	11.00 to 11.50
Cast borings	7.00 to 7.50

No. 2 Furnace of the Sheffield Coal & Iron Company at Sheffield, Ala., has been blown in. Repairs are being rushed to No. 1 Furnace at the same plant and operations will probably be commenced during the month of December.

Cincinnati.

CINCINNATI, OHIO, November 10, 1909.—(*By Telegraph.*)

Relatively there is little change in the local iron and steel markets save in old material, which is considerably weaker. The outlook in finished material from the viewpoint of branch agencies and jobbers is very bright. In the tool trade the output has reached its maximum capacity under embarrassing labor conditions, the demand for skilled mechanics continuing to exceed the supply. Coke is one of the strongest items in the list, and conditions in some producing districts are giving shippers and consumers considerable anxiety. The increasing scarcity of box and stock cars is creating much delay in transit and unloading.

Pig Iron.—There are few inquiries on hand to-day, the largest being that of a Chicago steel manufacturer for basic, 5000 tons, for January, February and March, for which there is considerable competition between Valley and other Ohio producers. The quoted price is close to $18, at furnace, Columbus having but 10c. advantage in freight rates over the next nearest competitors. The malleable buyers of last week are about all supplied, the Missouri consumer taking about 2000 tons, and it is reported at a price of about $19.50, delivered. It is understood that this melter will take more. The central Ohio buyer has also bought about 2000 tons, and, with a decided advantage in freights, has probably slightly shaded $17.50, at furnace, for first quarter delivery. The northern Ohio user of malleable in the market last week has taken some Lake Superior charcoal iron for mixture, 1000 tons, but is understood to be still in the market for malleable needs. Foundry grades are selling well, but in smaller tonnages. On Southern No. 2 foundry $14.50, Birmingham, can be done for the remainder of the year, but furnace prices seem firm, at $15, for first and second quarter delivery. Pig iron men believe that this will be the ruling price for the entire year. On Northern irons, spot deliveries and remainder of the year, the ruling price is $17, Ironton, for No. 2 foundry, with a 50c. premium for first half. Low grades are still scarce, and $13.75 for forge, with a 25c. differential for No. 4 foundry, is the best heard. Sloss interests announce that they have nothing under No. 3 foundry to offer for this year. The Chicago, Milwaukee & St. Paul purchase of Southern charcoal, 2000 tons, is reported to have been negotiated direct at a price of about $21.50, at furnace. Careful observers believe that stocks are dwindling, especially in the South, notwithstanding the tremendous rate of production, and assert that furnace books are in better condition than for many years. With rapidly increasing mill capacity for the consumption of basic, furnace owners in Ohio particularly, and in close proximity to the consumers, are getting stacks ready for making that grade of iron. Miami Furnace, 300 tons daily capacity, will blow in on basic as soon as the new casting machine is completed. Two stacks in the Ironton District have turned their attention to malleable. For prompt delivery and remainder of the year, based on freight rates of $3.25 from Birmingham and $1.20 from the Hanging Rock District, we quote as follows:

Southern coke, No. 1 foundry	$18.25 to $18.75
Southern coke, No. 2 foundry	17.75 to 18.25
Southern coke, No. 3 foundry	17.25 to 17.75
Southern coke, No. 4 foundry	16.75 to 17.25
Southern coke, No. 1 soft	18.25 to 18.75
Southern coke, No. 2 soft	17.75 to 18.25
Southern gray forge	17.00
Southern mottled	16.75
Ohio silvery, 8 per cent. silicon	20.20
Lake Superior coke, No. 1	18.70 to 19.20
Lake Superior coke, No. 2	18.20 to 18.70
Lake Superior coke, No. 3	17.70 to 18.20
Standard Southern car wheel	24.75 to 25.25
Lake Superior car wheel	21.75 to 22.25

(*By Mail.*)

Coke.—The market is stronger. A considerable supply of spot foundry grades has been sold to fill out requirements which fell short because of lack of box and stock cars in the Connellsville and Wise County regions. This shortage is more pronounced in the Norfolk & Western field. Consumers do not like their coke shipped in gondola cars. For spot foundry, producers of Connellsville standard brands are asking $3.25 to $3.40 per net ton at oven, with a premium of 10 cents on extended deliveries. Connellsville furnace grades are quotable at $2.85 to $3 for spot; on contract, $3 is about the ruling price. Wise County producers are asking $3 to $3.25 for spot foundry grades and $2.35 to $2.50 for furnace; on contract they are holding rather firm at $2.50 to $2.75 for foundry. Pocahontas foundry ranges from $2.75 to $3 spot and contract, while $2.65 to $2.75 covers the range on spot and contract for the furnace product.

Structural Material.—Mills are getting more independent about forward shipments, and on material that must be rolled the best that can be done is about 60 to 90 days. On standard sizes in stock it is possible to secure something like

a 10-day delivery, and material up to 15 in. is quoted at 1.60c., Pittsburgh, by the carload, and for smaller amounts the premium is often quite heavy, according to the consignee's desire for early shipment. Certain independent interests having offices in the Central West are reported to be getting 1.70c. in small quantities, and there is now no contracting. It is generally understood that some select business has been placed for the first half at the 1.60c. base price, and that the leading interest has taken some business to April 1 on this basis

Bars.—Mills are about 90 days behind on deliveries of steel bars. The price as quoted here is 1.50c., Pittsburgh, and on small lots from store dealers are getting 1.90c. to 2c. All local mills are rather uniform on iron bars at 1.55c. to 1.60c., Cincinnati, and there is an increasing demand.

Sheets.—It is reported that one or more of the leading interests are quoting 1906 prices on sheets, a price of about $8 a ton higher than to-day's market, and also that one of the leading interests has withdrawn for six months. On black No. 28, quoted in the Pittsburgh markets at 2.30c., mills of the Central West able to give reasonably early delivery are getting 2.50c., and on No. 28 galvanized, quoted regularly at 3.35c., Pittsburgh mill, they are getting 3.60c., Cincinnati. These same interests are getting a base price of $3 for galvanized, 2½ in. corrugations, in roofing sheets. No contracting is being done in this territory beyond the first quarter, and this is of a conservative order and to established customers. Shipments that can be made in four to five weeks are booked at a price $3 to $4 a ton higher than ruling quotations.

Old Material.—The market on old material is perceptibly weaker. Dealers differ on the percentage of weakness developed during the week, but every item may be said to be from 50c. to $1 a ton off. It is apparent to the larger dealers that old material advanced too rapidly and out of proportion to the iron and steel markets. October was the best month of the year with the largest interests here, and the sales of melting steel, railroad wrought and other seasonable items were tremendous. One local interest is accredited with handling 140,000 tons of scrap that month. The belief is expressed by conspicuous local authorities that the market may sag still lower before the first of the year, but that there will be a prompt recovery by that time. As nearly as conditions can be gauged under the conditions, dealers' asking prices for material delivered in buyers' yards in Cincinnati and southern Ohio are about as follows:

No. 1 R. R. wrought, net ton	$14.00 to $14.50
Cast borings, net ton	8.00 to 8.50
Heavy melting steel scrap, gross ton	15.00 to 16.00
Steel turnings, net ton	9.00 to 9.50
No. 1 cast scrap, net ton	14.00 to 14.50
Burnt scrap, net ton	10.00 to 10.50
Old iron axles, net ton	18.50 to 19.00
Old iron rails, gross ton	18.00 to 18.50
Old steel rails, short, gross ton	15.00 to 15.50
Old steel rails, long, gross ton	16.00 to 16.50
Relaying rails, 56 lb. and up, gross ton	22.00 to 22.50
Old car wheels, gross ton	15.50 to 16.00
Low phosphorus scrap, gross ton	17.50 to 18.00

St. Louis.

ST. LOUIS, November 8, 1909.

While the demand for pig iron from first hands is quieter, all the local foundries, mills and fabricators are running full. Jobbers of miscellaneous finished iron are very busy and the demand from St. Louis territory especially is very heavy. The exceptionally fine and mild weather is very favorable for building operations both in and out of the city and construction on all classes of buildings is going forward extensively. Large crops and good prices are rendering the buying power of agricultural sections very favorable. In the South the high price being realized for cotton is stimulating business.

Coke.—The demand for foundry coke continues quite active, though no large individual inquiries are reported. The fact that large buyers usually enter the market for contracts running for six months, from January to July, is mentioned as an explanation of no large inquiries pending at present. In case of some houses considerable difficulty is experienced in respect to shipment of Pennsylvania coke and box cars are reported very scarce. An inquiry is pending for 5000 tons per month of furnace coke. The market is strong and we quote for 72-hour foundry, standard Connellsville, for shipment over the remainder of the year, $3.25; for shipment over first half of 1910, $3.50 per net ton, f.o.b. oven. Furnace coke is quoted at $2.85 to $3.

Pig Iron.—Most of the principal agencies and brokers report the demand quiet and inquiries light. In view of the great and long continued activity no surprise is felt regarding this lull. In some instances sellers are giving more attention to looking after accommodating their customers by hurrying up shipments in conformity with specifications than to canvassing for new business. The only large inquiry reported is for 1500 to 2000 tons of malleable iron, and there is also some inquiry for car wheel iron. We learn of the sale of 500 tons of malleable. Prices on Southern coke iron are becoming difficult to obtain from many furnaces, for either prompt or forward shipment. Some houses have been able to secure certificates covering Southern foundry iron at concessions from the prevailing market price of parties wishing to realize. The discount is usually 50c. per ton, though in instances it has been more. These lots, however, are quite small and do not affect the general market. Most of the sales for the past week have been made for quick shipment to fill orders from buyers whose requirements had not been gauged sufficiently large in making earlier contracts. We quote Southern No. 2 foundry at $15 per ton, f.o.b. Birmingham, for shipment over the remainder of this and for first half of next year, with an occasional sale at a premium of 50c. to secure quick shipment or for a special brand.

Lead, Spelter, Etc.—The market for lead is quiet and firm at 4.25c., East St. Louis. Spelter is in fair demand and firm at 6.25c. Zinc ore is ruling at $51 to $52 per ton, Joplin, base. Tin is stronger, being 30c. per 100 lb. higher; antimony unchanged; copper unchanged. The demand for finished metals continues fairly good.

Old Material.—The demand for iron and steel scrap continues very moderate and there is some reaction in the market, a condition to some extent not unexpected by conservative parties. As three railroads are out with offerings—the St. Louis & San Francisco, the Wabash and the Missouri Pacific—whose lists aggregate over 6000 tons, this fact, taken in connection with the dullness of the demand, has led to some weakness in prices, though the figures current of late are only shaded in two or three items. In view, however, of the situation in this and other markets, quotations reported are to some extent nominal. We quote dealers' prices as follows, per gross ton, f.o.b. St. Louis:

Old iron rails	$18.00 to $18.50
Old steel rails, rerolling	16.50 to 17.00
Old steel rails, less than 3 ft.	16.00 to 16.50
Relaying rails, standard sections, subject to inspection	25.00 to 25.50
Old car wheels	17.50 to 18.00
Heavy melting steel scrap	16.00 to 16.50
Frogs, switches and guards, cut apart	16.00 to 16.50

The following quotations are per net ton:

Iron fish plates	$15.00 to $15.50
Iron car axles	21.00 to 21.50
No. 1 railroad wrought	15.50 to 16.00
No. 2 railroad wrought	14.50 to 15.00
Railway springs	14.00 to 14.50
Locomotive tires, smooth	16.00 to 17.00
No. 1 dealers' forge	11.50 to 12.00
Mixed borings	14.50 to 15.00
No. 1 boilers, cut to sheets and rings	11.50 to 12.00
No. 1 cast scrap	14.50 to 15.00
Stove plate and light cast scrap	10.75 to 11.25
Railroad malleable	13.50 to 14.00
Agricultural malleable	12.00 to 12.50
Pipes and flues	11.75 to 12.25
Railroad sheet and tank scrap	10.50 to 11.00
Railroad grate bars	12.00 to 12.50
Machine shop turnings	10.00 to 10.50

Owing to increased business and the necessity of having additional warehouse room, the Ludlow-Saylor Wire Company will expend $16,000 in building at 4364-72 Wabash avenue.

The Missouri Bridge Company, Kansas City, has incorporated under Missouri laws, with a capital stock of $25,000. The incorporators are David Wilson, A. G. Tauber and A. H. Tauber.

The Secretary of State, Jefferson City, Mo., has issued a charter to the Madill-Shreyer Engine Company, St. Louis; capital stock, $10,000; incorporators, Chas. A. Madill, Oliver H. Shreyer and Roger E. Balcour.

The Moline Plow Company, Moline, Ill., certifies to an increase of capital from $6,000,000 to $7,000,000.

At least six of the largest steel and construction companies of the country will submit bids for the steel work of the free bridge, but no St. Louis firm has asked for specifications. Bids will be opened November 16.

The German Iron Market.

BERLIN, October 28, 1909.

During the past week the iron trade has been marked by a quieter tone. For example, there is not a single price advance to report. There is, however, no disposition anywhere to conclude that the present upward movement has run its course. On the contrary, from most sections of the trade the reports continue to show that conditions are improving. The standstill in the matter of prices is doubtless due chiefly to the fact that the money market has begun to exercise an influence on the trade. The high discount rates recently adopted by the central banks of Germany and England are having a restraining effect on speculation in every direction, and this is making itself felt in the iron trade to some extent.

The Steel Syndicate, the great combination controlling the steel trade, held a meeting to-day at Dusseldorf and declared contracts open in structural shapes and billets for the first quarter of 1910 at unchanged prices. It had been expected in some quarters that the prices of steel material would be advanced. Probably the managers of the syndicate

were deterred from making a change by the money market consideration just mentioned. They are doubtless aware too, that the market situation is still such that consumption needs to be carefully nurtured and encouraged.

The syndicate gave out an unusually optimistic report in connection with its meeting. The home trade in billets, it says, has continued to develop favorably, and specifications are coming in more briskly, while the tone of the foreign market remains firm in view of the fact that American competition has dropped out. In heavy steel rails the takings for the home market remain restricted, owing to the policy of rigid economy now pursued by the Prussian railroads, but the confident tone of the foreign market has continued unabated. Numbers of foreign railroad companies have sent in long orders, some of them running till 1912; foreign buyers do not hold back at the higher prices now in force. Rails for mines are being called for delivery both at home and abroad at a brisk pace; but prices are still unsatisfactory owing to foreign competition. Grooved rails are quieter, especially for early delivery; but brisk business is expected by next spring, in view of projects now in sight. The home demand for structural shapes for delivery during the current quarter has become more active; orders on hand at the beginning of this month exceeded those of a year ago by 175,000 tons.

Forecasting the future, the syndicate mentions that a feeling of confidence prevails among buyers that business will be better next spring; but it alludes with a shade of misgiving to the high bank rate, the effects of which, it says, cannot yet be foreseen.

The ore association at Siegen gave out a report to-day showing an increase of 17 per cent. for August, and 15 per cent. for September in the production of ore. Shipments for September were 35 per cent. greater than for September, 1908. There is also a brisker demand for the phosphoric ores of the Lorraine-Luxemburg district, and prices are firm. The trade in foreign ores is very active, with a tendency toward higher prices. Swedish ores are scarce in the market; and now that shipments are again possible, the strike in Sweden having broken down, nearly all available ores are being snapped up by American buyers.

The pig iron trade is quieter, most works having already placed their contracts reaching far along into next year. Several sales of hematite to American buyers are mentioned in the latest reports, and some buying of scrap for American account is also reported.

The bar trade has continued to improve. The prices now quoted range between 104 and 106 marks, but probably sales are made also at lower prices. The stock market had as a bull point yesterday a rumor that the price of bars was to be further advanced. The trade in heavy plates is still in pretty bad shape. The mills have been trying for some time to effect a special trade organization, but these efforts have proved fruitless, and now a loose price agreement, such as exists in the bar trade, is projected.

A review of conditions in the hardware trade shows that the general improvement of business has been felt only to a moderate extent in it. The amount of work has increased in nearly all kinds of shops, and in not a few the improvement has been considerable; but manufacturers still complain that prices cannot be raised from their present low level. At Solingen the falling off in American orders after the tariff rush of the spring and summer has been neutralized by larger home orders. In the Remscheid District, one of the chief centers of the tool trade, business has strongly improved. In building hardware the outlook has grown brighter and dealers are enlarging their stocks. Rivets and screws are in more active demand, while wire products are going off like hot cakes.

The Maryland Steel Company.—One of the four furnaces of the Maryland Steel Company, Sparrows Point, Md., was blown out for repairs October 27. The company is making additions to its unloading equipment at Sparrows Point, in view of the increased shipments of Cuban ore for both the Pennsylvania Steel Company and the Maryland Steel Company expected next year from the Mayari District. Two rapid unloaders with a capacity of 500 tons per hour will be installed by the Brown Hoisting Machinery Company, Cleveland, Ohio. Work is now in progress on the open hearth steel plant, which will be operated under the duplex process in connection with the existing Bessemer works.

The Bethlehem Steel Company has announced that the wages of its several thousand employees would be restored to the scale in vogue before the 1907 depression. In general, the increase will amount to 10 per cent., and will affect employees in the machine shops, foundries, blast furnace department and unskilled labor.

Iron and Industrial Stocks.

NEW YORK, November 10, 1909.

Prices of iron and industrial stocks have been well maintained on nearly the entire list. Values are affected by the developments of each day, fluctuating according to the conditions of the money market or the trade news, without any general tendency in either direction. The range of prices on active iron and industrial stocks from Thursday of last week to Tuesday of this week was as follows:

Allis-Chalm., com..	15½- 16	Railway Spr., pref.....	104⅝
Allis-Chalm., pref..	53¾- 56	Republic, com.....	47 - 49⅛
Beth. Steel, com...	34 - 36¼	Republic, pref.....	105¾-107⅛
Bethlehem Steel, pref...	67½	South. I. & S., com.	21 - 21⅝
Can, com.....	12¼- 13¾	South. I. & S., pref.	50½- 52¾
Can. pref.....	82¾- 84¾	Sloss, com.....	90½- 91¾
Car & Fdry, com..	74¼- 76½	Pipe, com.....	33 - 34½
Car & Fdry, pref..	119⅝-120	Pipe, pref.....	86 - 87⅛
Steel Foundries....	65 - 66⅛	U. S. Steel, com...	89⅜- 93⅛
Colorado Fuel.....	48¼- 51¾	U. S. Steel, pref...	126½-129
General Electric...	162 -164¾	Westinghouse El...	85½- 88¼
Gr. N. ore cert....	81 - 83½	Va. I., C. & C.....	70 - 72
Int. Harv., com...	108 -111½	Chi. Pneu. Tool...	38½- 39
Int. Harv., pref...	125¼-126½	Am. Ship, com....	67 - 68
Int. Pump, com...	49¾- 52¾	Am. Ship, pref....	110 -110½
Int. Pump, pref...	89¾- 90½	Cambria Steel.....	46 - 47¼
Locomotive, com...	61¾- 63¾	Lake Sup. Corp....	27¼- 27⅝
Locomotive, pref...	115¾-116	Penn. Steel, pref.....	116½
Nat. En. & St.,com.	20½- 21	Crucible St., com..	14 - 14⅛
Pressed St., com...	50½- 55	Crucible St., pref..	83¾- 84
Pressed St., pref...	104¾-107⅞	Harb.-W. Ref., pref.....	95
Railway Spr., com.	49½- 51½		

Last transactions up to 1.30 p.m. to-day are reported at the following prices: United States Steel common 89¼, preferred 126, bonds 105; Car & Foundry common 74⅛, preferred 119½; Locomotive common 61½, preferred 115⅞; Steel Foundries 64⅜; Colorado Fuel 47½; Pressed Steel common 51¼, preferred 105½; Railway Spring common 49¾; Republic common 47¼, preferred 106; Sloss-Sheffield common 90; Cast Iron Pipe common 33, preferred 86⅞; Can common 13⅝, preferred 83½.

Iron and Steel Bonds.

Chisholm & Chapman, 18 Wall street, New York, furnish the following quotations:

	Bid.	Asked.
Bethlehem Steel 1st ext. 5s, due January, 1926....	117	..
Bethlehem Steel purchase money 6s, August, 1998.. ..		89¾
Buffalo & Susquehanna Iron 1st 5s, June, 1932.... ..		99½
Buffalo & Susquehanna Iron deb. 5s, January, 1926.	94	94⅞
Dominion Iron & Steel 5s, July, 1929.....	95½	..
La Belle Iron 1st 6s, December, 1923.....	104	104½
Lackawanna Steel 1st 5s, April, 1923..... ..		98¾
Maryland Steel 1st 5s, February, 1922.....	102	104
Pennsylvania Steel 1st 5s, November, 1917.....	102	..
Pennsylvania & Maryland Steel 6s, September, 1925 ..		110½
Republic Iron & Steel 1st 5s, October, 1934.....	101	102
Sloss Iron Steel 1st 6s, February, 1920.....	100	..
Sloss Iron & Steel consol. 4½s, April, 1918.....	95½	..
Jones & Laughlin Steel 1st 5s, May, 1939.....	101¾	102½
United States Steel Corporation.		
Collateral Trust 5s, Series A, C, E, April, 1951....	114¾	115½
Collateral Trust 5s, Series B, D, F, April, 1951....	114¾	115½
Sinking fund 5s, April, 1963.....	105	105¼
Union Steel 1st 5s, December, 1952.....	104	..
Clairton Steel 5s, 1908-1913.....	100	..
St. Clair Furnace 1st 5s, 1910-1939.....	100	..
St. Clair Steel 1st 5s, 1908-1926.....	100	..
Illinois Steel deb. 5s, January, 1910.....	100	..
Illinois Steel 5s, April, 1913.....	100	..

All bonds quoted " and interest."

The stockholders of the Bethlehem Steel Corporation, at a special meeting held last week, approved the issue of $7,500,000 6-per cent. five-year sinking fund gold notes of the Bethlehem Steel Company. The proceeds of these notes are to be used for additions and improvements and to retire the existing issue of $2,500,000 6 per cent. gold notes. President Charles M. Schwab, on being questioned by a stockholder as to the probabilities of a dividend on the common stock, stated that he could not hold out any hope for the resumption of common dividends in the near future, at least not during next year. In explanation he said that, while the plants of the Bethlehem Steel Corporation were operating at full capacity, at the same time consideration had to be taken of the fact that personal funds had been advanced to supply floating capital and other necessities of the company, and until these funds had been returned he did not think it would be proper to take up the question of common dividends. For the present, Mr. Schwab said, his chief interest lay in paying dividends on the preferred stock. He added that he himself was drawing no salary as president of the company.

Dividends.—The Niles-Bement-Pond Company, New York, has declared the regular quarterly dividend of 1½ per cent. on the preferred stock, payable November 15, and 1½ per cent. on the common stock, payable December 20.

The Pratt & Whitney Company has declared the regular quarterly dividend of 1½ per cent. on the preferred stock, payable November 15.

The American Radiator Company has declared the regular quarterly dividend of 1¾ per cent. on the preferred stock, payable December 16, and 1½ per cent. on the common stock, payable January 21.

The International Harvester Company has declared the regular quarterly dividend of 1¾ per cent. on the preferred stock, payable December 1. The directors took no action toward declaring a dividend on the common stock, although it had been generally expected.

Pittsburgh.

PARK BUILDING, November 10, 1909.—(*By Telegraph.*)

Pig Iron.—On Tuesday, November 9, the Jones & Laughlin Steel Company bought 10,000 tons of standard Bessemer iron from the Bessemer Pig Iron Association for November, December and January delivery at $19, Valley furnace, and 10,000 tons from W. P. Snyder & Co. at the same price and for the same delivery. The Jones & Laughlin Company has been a persistent buyer of pig iron for some time, having taken since late in August a total of about 76,000 tons. It has been delayed in getting its new blast furnaces at Aliquippa started, and has been buying to insure itself against any shortage in supply. The Bollinger-Andrews Company, of this city, is in the market for 10,000 tons of Bessemer iron for delivery over all next year. General buying of pig iron in this district has been quiet in the past week or two, but the market is very strong. Prices are firm, but unchanged. We quote Bessemer iron at $19 for November and December and first quarter of next year; basic, $17.25 for prompt shipment and $17.50 for first quarter; No. 2 foundry, $17.25 to $17.50; malleable Bessemer, $17.50 to $17.75, and gray forge, $16.25 to $16.50, all at Valley furnace, with a freight rate of 90c. a ton for delivery in the Pittsburgh District.

Steel.—As showing the enormous demand for steel billets and sheet and tin bars we can state that the Carnegie Steel Company has decided to start up its Bessemer steel department at the Homestead Steel Works, which has not been operated for a long time. The plant contains two 10-ton converters and can make about 1500 tons of steel per day. While there is not much new demand for billets and sheet and tin bars, all consumers are specifying heavily, and the shortage in the supply of steel seems to be getting worse. Some of the sheet and tin plate mills are not able to run full time on account of the delays in deliveries of steel. Premiums are still being paid for reasonably prompt shipment, and Bessemer 4 x 4 in. billets for early delivery are held at about $27 and open hearth at $28 to $28.50, at makers' mills. Sheet and tin bars for prompt shipment are commanding $1 to $2 a ton premium over regular prices.

(*By Mail.*)

Large orders for steel cars are the most encouraging feature of the week in the steel trade. Inquiries from more leading roads are now in the market, and other large orders will probably be closed shortly. The pig iron market has been rather quiet, the demand from outside districts being much heavier than from consumers here. The Bessemer Pig Iron Association has not sold any Bessemer iron above $19, at furnace, for next year's delivery, and reports of sales of 3000 to 5000 ton lots for prompt delivery by outside interests at $19.50 and $19.75 for prompt shipment have not been verified and have probably been circulated for the purpose of booming the market. The scarcity of steel is as great as ever. The Carnegie Steel Company is now rolling small billets on its No. 2 Edgar Thomson rail mill at Bessemer to help out on its contracts. Sheet and tin bars for spot shipment have sold at $29 and as high as $29.50, but these prices are, of course, above the regular market. In finished material the only change in prices during the week was an advance of one point, or about $2 a ton, on iron pipe. The trade is expecting an early advance in prices on sheets, steel pipe and wire products. The scrap trade is looking up somewhat in inquiry and the tone of the market is stronger. Several large contracts for furnace coke for shipment over the first half of next year have been made at $2.80 and $2.85 per net ton, at oven. The leading steel mills are filled up with practically all the tonnage they can turn out in the next four or five months, and belated deliveries are still the order of the day.

Ferromanganese.—The market is very strong and inquiries are active. It develops that the purchases of ferromanganese by the Carnegie Steel Company for delivery over the next three or four months probably amount to 15,000 tons or more. It is running its two Lucy furnaces on ferromanganese, but is not able to make enough to supply its larger requirements, as all its steel plants are now running to utmost capacity. We quote foreign 80 per cent. ferromanganese at $44.50 to $45, seaboard, for this year, while for first half of next year $45 to $46 is quoted.

Ferrosilicon.—There is an inquiry in the market for 250 to 300 tons of 50 per cent. that will likely be closed this week. The market is very strong and predictions are made that prices will soon be higher. We quote 10 per cent. at $23.90; 11 per cent., $24.90; 12 per cent., $25.90, and 50 per cent., $64.50, Pittsburgh.

Muck Bar.—An inquiry for 3000 to 5000 tons of muck bar for delivery over the first half of next year is reported to be in the market. We quote best grades, made from all pig iron, at $29.50 to $30, Pittsburgh.

Wire Rods.—The market is very strong and prices are higher. The American Steel & Wire Company, the leading maker, is not seeking new business in rods, having all the orders it can take care of for some time. We have advanced prices and now quote Bessemer, open hearth and chain rods at $32.50 to $33, Pittsburgh.

Skelp.—We note a sale of 5000 tons of sheared skelp in narrow sizes on the basis of 1.60c., at mill. Prices are higher. We now quote: Grooved steel skelp, 1.55c.; wide skelp in sheared sizes, 1.60c.; grooved iron skelp, 1.75c. to 1.85c., and sheared sizes of wide iron skelp at 1.90c. to 1.95c., f.o.b., at mill, Pittsburgh.

Steel Rails.—The Carnegie Steel Company has taken 14,000 tons of standard sections for the Pittsburgh & Lake Erie, controlled by the New York Central, and 20,000 tons for the Erie Railroad. The Baltimore & Ohio, New York Central, Chesapeake & Ohio and other roads are figuring actively on their requirements of rails for 1910. Last week the Carnegie Steel Company received orders and specifications for 3450 tons of light rails. We quote steel axles at 1.75c. to 1.80c., and splice bars, 1.50c., at mill, Pittsburgh. Light rail prices are as follows: 8 to 10 lb., $32; 12 to 14 lb., $29; 16, 20 and 25 lb., $28; 30 and 35 lb., $27.75, and 40 and 45 lb., $27, Pittsburgh. These prices are for 250-ton lots and over, and for small lots premiums of 50c. per ton and more are being paid. We quote standard sections at $28, at mill.

Plates.—The order of the Pennsylvania Railroad for 5000 steel cars has not been placed, but will likely be given out shortly. The Delaware, Lackawanna & Western has bought 1000 steel cars, and the New York Central is figuring on more cars, in addition to the heavy orders it placed recently. The Carnegie Steel Company has taken the plates and shapes, about 3500 tons, for a new ore boat. Some seven or eight ore boats are under negotiation, which will likely be placed soon. The contract for about 4800 tons of plates for the riveted pipe extension to the Brooklyn water works is likely to be placed next week. The specifications on these plates are very severe, and for this reason the business may be refused by local mills. Prices on plates are strong, and the leading mills are now quoting 1.55c., Pittsburgh, on ¼-in. and heavier plates, for reasonably prompt shipment, and some tonnage has been sold at 1.60c., at mill.

Structural Material.—The McClintic-Marshall Construction Company will build new bridge shops at Indiana Harbor, Ind., and it has taken some manufacturing buildings for the Watt Mining Car Wheel Company, at Barnesville, Ohio, about 250 tons; also a power house for the Lake Shore & Michigan Southern Railroad, at Ashtabula Harbor, about 400 tons, and the ore bins for the two new blast furnaces of the Bethlehem Steel Company, at South Bethlehem, Pa., 1000 to 1200 tons. These ore bins will be of the Hoover & Mason design. Deliveries of plain material by the mills are still very unsatisfactory, but are a little better than they were some time ago. The market is very strong. We quote beams and channels for reasonably prompt shipment at 1.55c., and a good deal of tonnage has been sold at 1.60c., at mill. Plain material is higher now than it was last February, when the open market was declared.

Sheets.—The high prices ruling for sheet bars and the persistent advances in spelter are responsible for an advance of about $2 a ton in both black and galvanized sheets, which some mills are now asking, both for this year and for first quarter of next. In fact some sheet mills are practically declining to enter orders for sheets for first quarter until they know what they will have to pay for bars. All the sheet mills are considerably behind in deliveries. Prices on sheets, as quoted by some mills for reasonably prompt shipment, are as follows: Blue annealed sheets, Nos. 3 to 9, 1.65c.; Nos. 9 and 10, 1.70c.; Nos. 11 and 12, 1.75c.; Nos. 13 and 14, 1.80c., and Nos. 14 and 15, 1.90c. One-pass box annealed No. 28 black sheets, 2.30c., and No. 28 galvanized, 3.35c., at mill. We quote corrugated roofing sheets at $1.60 per square for painted and $2.85 for galvanized, 2½-in. corrugations. Jobbers charge the usual advances over these prices for small lots from store. We may note that the above prices are absolutely minimum of the market, some mills quoting an advance of $2 to $3 a ton.

Tin Plate.—The strike in the New Castle and Shenango tin plate mills of the American Sheet & Tin Plate Company at New Castle, Pa., is practically broken, and the company is receiving applications for positions every day from former employees who have decided to return to work if they can. Plans have been under way for a year or more in the engineering department of the company for the new sheet and tin plate mills to be built at Gary, and while details are not ready to be given out, it can be said that they will be the largest in the world. New orders for tin plate are coming in freely and also specifications against contracts. Shipments by the leading mills in October are said to have broken all former records. We quote 100 lb. cokes at $3.50 per base box, f.o.b. Pittsburgh, for the remainder of this year and first quarter of next year.

Bars.—There is no abatement in the volume of specifications being received by the mills for steel bars, and deliveries are as far behind as ever. The announcement of the Carnegie Steel Company that it will build finishing mills at Girard, Ohio, with a capacity of turning out 30,000 tons of finished steel bars per month is of interest to the trade, and

indicates thoroughly the growing consumption of steel bars for all purposes. The greatest increase in the consumption of steel bars in the last two years has been for concrete reinforcing purposes, and an enormous tonnage is required for this trade. The bar iron mills in this district are filled up with orders, and are nearly as badly off in the matter of deliveries as the steel bar mills. If present conditions continue a greater shortage in both iron and steel bars than now exists is probable. We quote steel bars at 1.50c. to 1.55c., at mill, for reasonably prompt shipment, but on contracts for delivery ahead, two leading makers continue to quote about 1.45c., at mill. Prices on iron bars are higher, and we quote at 1.65c. to 1.70c., Pittsburgh, for reasonably prompt shipment.

Hoops and Bands.—New orders are being placed freely with the mills, and specifications are coming in at a rapid rate, shipments being larger than at any time in the past two years. We quote steel hoops for forward delivery at 1.50c. to 1.55c. and for prompt shipment at 1.60c. to 1.65c., at mill. Steel bands are very firm, at 1.45c. to 1.50c., on contracts for forward delivery, and 1.55c. to 1.60c. for reasonably prompt shipment.

Spelter.—Makers of galvanized material are buying heavily and the recent sharp advances in prices of spelter, amounting to $5 or $6 a ton, are being firmly held. We quote prime grades of Western spelter at 6.15c. to 6.20c., East St. Louis, freight to Pittsburgh being 12½c. per 100 lb.

Spikes.—The New York Central, Pennsylvania, Pittsburgh & Lake Erie and other leading roads are reported in the market with large inquiries for spikes. The market is very firm and one or two leading makers are quoting higher prices. For local trade standard sizes of railroad spikes are held at $1.75 to $1.80, while for delivery in Eastern and Western territory $1.70 to $1.75 is being quoted for carload and larger lots, with 5c. per keg advance for small lots.

Shafting.—New orders are being placed freely at prices adopted by the manufacturers some time ago, while specifications against contracts are active and shipments of shafting by the mills are heavier than at any time in the last two years or more. The Republic and Jones & Laughlin companies, the local makers of shafting, are operating their works to full capacity and have a great many orders ahead. The market is firm, on the basis of 57 off in carload lots and 52 in less than carload lots, delivered in base territory and for delivery this year, while for delivery next year quotations are 55 in carload and larger lots and 50 off in less than carload lots, delivered in base territory.

Rivets.—Makers advise us that new demand is fairly heavy, but a good many consumers bought freely before the advance in prices, and are specifying actively against these orders. Another meeting of the rivet makers will be held in New York City next week, but it is not expected that any change in prices will be made. We quote as follows: Structural rivets, ¾ in. and larger, 2.05c., base; cone head boiler rivets, ¾ in. and larger, 2.15c., base; ⅝ in. and 11-16 in. take an advance of 15c., and ½ in. and 9-16 in. take an advance of 50c.; in lengths shorter than 1 in. also take an advance of 50c. Terms are 30 days, net cash, f.o.b. mill.

Merchant Pipe.—Spang, Chalfant & Co., Inc., and the Youngstown Sheet & Tube Company, large makers of iron pipe, have advanced quotations one point, or $2 a ton, and are now holding firmly for the higher discounts. Some very large projects that will require a heavy tonnage in the larger sizes of pipe are being agitated, but none of these is yet in shape to go into details. The mills have all the business they can handle, and are behind in shipments. It is still expected that an advance in prices of steel pipe will be made, largely on account of the higher prices and scarcity of raw steel. The official discount on black steel pipe, ¾ to 6 in., is now 80 and 5, and on iron pipe, ¾ to 6 in., 74 and 5, in carload and larger lots to the largest trade. It should be noted that these prices are absolutely minimum, and are only made to the large trade in carload and larger lots, jobbers charging the usual advances to the smaller trade for shipments from store.

Boiler Tubes.—Spang, Chalfant & Co., Inc., have received a contract for the boiler tubes for 50 locomotives to be built by the Baltimore & Ohio Railroad, in addition to the boiler tubes for 60 locomotives placed by this road with the same company some time ago. We are advised that orders for locomotive tubes are heavy, more actual business now being placed than at any time for several years. The demand for merchant tubes is also active, and the mills are entering a large amount of new business and at full prices. It is stated that regular discounts on both locomotive and merchant tubes, printed elsewhere, are now being absolutely held.

Iron and Steel Scrap.—The tone of the scrap market is a little stronger than it was last week, and there is more inquiry. The situation seems to be that consumers are pretty well covered and are not disposed to take on tonnage at present prices, while dealers are afraid to sell unless they have the material, feeling that the market may advance. For this reason the actual amount of scrap that is being sold by dealers to consumers at present is probably smaller than at any time in the past three or four months, which were very active. While most dealers continue to quote heavy steel scrap at $18, small lots can be picked up at $17.50 to $17.75, but on any large tonnage, for delivery over two or three months, it is likely that $18 would have to be paid. Prices on other grades of scrap, per gross ton, f.o.b. Pittsburgh, are as follows: No. 1 cast scrap, $17.25 to $17.50; No. 2, $16.25 to $16.50; bundled sheet scrap, $16.25 to $16.50; No. 1 railroad malleable, $16 to $16.25; rerolling rails, $18.25 to $18.50, for delivery at Newark, Cambridge or Cumberland, Md.; grate bars, $14 to $14.25; No. 1 busheling scrap, $16.25 to $16.50; No. 2, $13.25 to $13.50; low phosphorus melting stock, 0.04 and under, $21 to $21.25; steel axles, $21.50 to $21.75; iron axles, $27.50 to $28; locomotive axles, $28 to $28.25; old car wheels, $18.50 to $18.75, and No. 1 railroad wrought scrap, $18.50 to $18.75. Borings and turnings are still weak, and we quote cast iron borings at $11 to $11.25 and machine shop turnings, $13.25 to $13.50. Sheet bar crop ends are firm at $19.50, at shipping point. The scrap list of the Pennsylvania Lines West closed November 3, but very little material was secured by Pittsburgh dealers, a number of whom did not bid on the list. The Pennsylvania Railroad list closed Tuesday, and in this case also some of the larger dealers did not send in bids. A sale is reported of 500 tons of rivet scrap to a local consumer at $18, delivered; also a sale of 500 to 600 tons of heavy steel scrap at about $17.75, delivered.

Coke.—The largest coke transaction of the week is a sale of 30,000 tons per month for the first half of 1910 to the Cambria Steel Company by the Sunshine Coke Company, Connellsville, Pa., at $2.80 per net ton, at oven. Another sale is reported of 5000 tons per month of standard furnace coke for first half of 1910 at $2.85, at oven. Standard makes of furnace coke for delivery over the remainder of this year can be had at about $2.75, at oven. There is a good deal of inquiry for foundry coké for the first half, and makers are firm in their ideas as to prices. We quote standard Connellsville furnace coke for first half of next year at $2.80 to $2.90 per net ton, at oven, while 72-hour foundry coke of the best grades is held at $3 and up to $3.50 per net ton, at oven, for first half. The output of coke continues enormously heavy, running larger than at any previous time in the history of the coke trade. Last week the Klondike and Connellsville regions turned out close to 450,000 tons.

Koehler & Streng, for some years located at 2830 Liberty avenue, Pittsburgh, will about January 1, 1910, remove their iron and steel scrap yard and office to Carnegie, Pa., where they have secured over four acres of land on the Panhandle Division of the Pennsylvania Railroad. Several buildings, including a main structure, 80 x 125 ft., to serve as a shear shed, are being erected, and a new steam crane and other equipment are being added.

New York.

NEW YORK, November 10, 1909.

Pig Iron.—There has been further activity in foundry iron, and in the past week the pending air brake foundry contracts were closed, amounting to 13,000 tons. A pipe interest has taken several thousand tons of spot iron and eastern Pennsylvania furnaces have sold some round lots of forge, foundry and low phosphorus irons. One eastern Pennsylvania foundry bought 5000 tons. A London firm which has not figured hitherto in this trade is sending a cargo of Middlesbrough pig iron to the Atlantic seaboard, and a merchant interest in this country has arranged for two cargoes, to arrive in January and March respectively. Middlesbrough warrants to-day were 50s. 10d., which represents a decline of about two shillings from the recent high point. In only two cases have consumers directly contracted for foreign iron. The other cargoes now on the way or expected are for merchant interests. We quote New York prices as follows: Northern No. 1 foundry, $19 to $19.50; No. 2 foundry, $18.50 to $19; No. 2 plain, $18 to $18.50; all for delivery this year. Little Alabama iron is sold in this market. The quotation for next year's delivery, first quarter, is $19, New York.

Steel Rails.—The New Haven Road's requirements as now proposed for 1910 are 15,000 tons. Other Eastern roads are figuring, but no sales are reported for the week. In the Chicago District the booking of 83,000 tons is reported, this amount being distributed among eight roads. The Interborough Company is in the market for 6000 tons of open hearth rails—4000 tons for the Subway and 2000 tons for the elevated lines.

Structural Material.—A number of large contracts have come before the fabricating trade just at a time when the outlook was for quieter conditions. For the Fourth Avenue Subway in Brooklyn 28,000 tons of steel will be needed for the two sections now to be let, and the total will be 35,000 tons if pipe galleries are decided on. Deliveries will begin

in April and contractors estimate that all the steel will be needed in 1910. Railroad bridge work is expected to be plentiful next year if present plans of railroad engineers are carried out. Western roads have placed additional orders in the past week, the American Bridge Company taking 400 tons for the Chicago & Northwestern and 200 tons for the St. Paul, while the Wisconsin Bridge Company will furnish 350 tons for the Vandalia. At Chicago the Lake Shore let track elevation work amounting to 1000 tons. There is some variation in prices for plain material, some mills selling at 1.66c. to 1.71c., tidewater, while others obtain 1.76c. On material cut to length from stock the price is about 2c.

Ferroalloys.—The demand for ferromanganese continues good, and prices are firm. Sellers are quoting ferromanganese for delivery over the first half of next year at $45, and over the last half at $45.50 to $46. Ferrosilicon is selling at $62 to $63.

Bars.—The Eastern bar iron mills report a continued excellent demand. The leading mills are stated to be operating to full capacity on specifications on contracts and are holding prices at 1.70c. to 1.75c., tidewater, while the smaller mills are taking much of the current business at 1.65c. to 1.70c., tidewater, according to quality, quantity and character of specifications. Manufacturers are still careful in taking contracts for delivery far into the future. Steel bars continue to be quoted at 1.66c. to 1.71c., tidewater, but are difficult to get for early shipment.

Cast Iron Pipe.—The market is much more active. Buyers for delivery next year are now coming in quite freely, placing contracts for both water and gas pipe. As an illustration of the activity in this trade, one pipe manufacturer in one day this week entered orders aggregating 83 miles. The city of New York will open bids November 17 on contracts aggregating about 15,000 tons for use in Brooklyn. This is the most important public letting now in sight. Prices have advanced again and carload lots of 6-in. are now quoted at $26 per net ton, at tidewater.

Old Material.—Dealers report a quiet market. Heavy deliveries of steel scrap are being made to the various steel works in eastern Pennsylvania under conditions which are more satisfactory, as fewer rejections are now being made. The rolling mills are purchasing fair quantities of some classes of old material, but the buying of other grades is light. The local foundries are apparently well supplied with stock, as their demand has fallen off to some extent. The Isthmian Canal Commission has adopted a new plan for the disposal of the scrap accumulations at Panama. Small cargoes are coming on the vessels plying between New York and Panama, and on the arrival of each cargo bids are asked. According to a ruling of the Treasury Department, this material comes in duty free. The bidding on these cargoes is somewhat hampered by the conditions imposed, which require that the scrap shall be loaded on cars at Jersey City and the successful bidder is to assume all charges for cars on which the scrap awarded to him is loaded. This is likely to involve charges for demurrage. While the general demand for scrap is light, prices are practically unchanged. Quotations are as follows, per gross ton, New York and vicinity:

Rerolling rails	$16.00 to $16.50
Old girder and T rails for melting	15.00 to 15.50
Heavy melting steel scrap	15.00 to 15.50
Relaying rails	22.00 to 22.50
Standard hammered iron car axles	24.50 to 25.00
Old steel car axles	21.50 to 22.00
No. 1 railroad wrought	18.00 to 18.50
Wrought iron track scrap	16.00 to 16.50
No. 1 yard wrought, long	16.00 to 16.50
No. 1 yard wrought, short	15.50 to 16.00
Light iron	10.50 to 11.00
Cast borings	10.50 to 11.00
Wrought turnings	12.00 to 12.50
Wrought pipe	14.00 to 14.50
Old car wheels	15.50 to 16.00
No. 1 heavy cast, broken up	15.50 to 16.00
Stove plate	13.00 to 13.50
Locomotive grate bars	12.50 to 13.00
Malleable cast	16.00 to 16.50

C. H. Hughes & Co., engineers, formerly at 120 Broadway, have moved to the U. S. Realty Building, 115 Broadway, New York.

The Pocahontas Consolidated Collieries Company, Inc., 30 Pine street, New York, has terminated its agency contract for the sale of coal through Castner, Curran & Bullitt, effective April 1, 1910, and organized its own sales department to deal directly with the coal trade, known as the Pocahontas Fuel Company, with an authorized capital of $1,000,000. This new company, after the date mentioned, will have over 2,000,000 tons of Pocahontas coal to market. It will have branch offices at Boston, Mass.; Norfolk, Va.; Bluefield, W. Va.; Cincinnati, Ohio; Chicago, Ill., and possibly other New England and Northwestern points, with also a London agent. Isaac R. Mann is president of the Pocahontas Fuel Company, Charles S. Thorne is vice-president and Thomas F. Farrell is general manager.

Metal Market.

NEW YORK, November 10, 1909.

Copper.—Despite the fact that much of the talk of large sales of copper has been made to inspire favorable newspaper reports, it is apparent that there is a good buying movement on. Copper is firmer, and, considering the fact that the report of the Copper Producers' Association, which was made public to-day, is fairly favorable a rising market can be looked for. The statistics show that the stock on hand at all points in the United States increased only 2,036,854 lb., although the production was considerably greater. The deliveries for domestic consumption are surprisingly favorable, owing to an increase of 14,254,462 lb. over the previous month, which indicates a healthy growth. It is highly probable that the next few days will witness some active trading as a result of this report, as there are some good sized inquiries out, and it is thought that the parties inquiring were waiting for the producers' report. It is estimated that close to 20,000 tons of copper changed hands in New York during the week. At present copper is firmer than it has been in a number of weeks. Electrolytic is 13c.; lake, 13.25c., and casting copper, about 12.85c. The London market is strong in response to the buying movement here, and to-day spot copper was sold there for £58 10s. and futures for £59 15s. The exports of copper so far this month have been 6471 tons, which indicates a slight decline in the shipments abroad.

Waterbury Average.—The Waterbury average for October was 13⅛c.

Pig Tin.—But little buying has been done during the week and the pig tin market is rather stagnant. There is a hopeful tone, however, as the volume of inquiries shows that there are some parties who are inclined to buy, and it is not thought that the can manufacturers will stay out of the market much longer. This optimistic feeling is keeping prices up just above the cost of import, and what selling has been done was made on a solid basis, as it is known that the tin which changed hands is going into consumption. The prices for the week were as follows:

	Cents.
November 3	30.40
November 4	30.35
November 5	30.45
November 8	30.69
November 9	30.60

The London market is quiet and easy and spot tin sold there to-day for £138 10s. and futures for £140 12s. 6d. The arrivals of pig tin in this country so far this month have been 930 tons, and there are 1400 tons afloat.

Tin Plates.—The price of tin plate has not yet advanced, but it is hardly possible for buyers who have no regular connections to get tin plate at the regularly quoted price. As a matter of fact, even when the purchaser is willing to pay a premium, he frequently has to shop about a great deal to place a good sized order, as in addition to the producers being unable to fill the demand a car shortage is affecting shipments to some extent. Altogether the buyers' position at present is not an enviable one and the demand is so great that even should the price of tin plate be raised it is not thought that the situation would be helped any. Most of those who are inquiring are not haggling over the price, but are desirous of getting quick deliveries at any fair figure. We quote for 100 I C coke plates $3.74.

Lead.—Lead is in better demand and outside interests are in some cases asking more than the price made by the American Smelting & Refining Company. There is a fair volume of inquiries from all of the industries that are the largest users of lead, and the lead pipe manufacturers in particular are placing some good orders. It is hard to buy lead from the outside interests for anything less than 4.42½c., and some sellers have been asking 4.45c. The American Smelting & Refining Company continues to quote the New York market at 4.40c. and St. Louis market at 4.25c. The outside market is: New York, 4.42½c. to 4.45c., and St. Louis, 4.27½c.

Spelter.—Spelter is still selling well, and the market is very firm at 6.30c. It is thought in some quarters that manufacturers have put the price to where they consider they can get a fair profit and they have stopped advancing the market for a time at least. It is evident that they do not intend to let spelter go any lower for a time, so consumers are buying in fairly good quantities. We quote the market here at 6.30c. and in St. Louis at 6.10c. to 6.15c.

Antimony.—But little antimony is being called for and prices are unchanged, with Hallett's at 8.25c.; Cookson's at 8.30c., and other brands at 7.75c.

Old Metals.—The market is strong, with an advancing tendency. Following are dealers' selling prices:

	Cents.
Copper, heavy cut and crucible	12.75 to 13.00
Copper, heavy and wire	12.25 to 12.50
Copper, light and bottoms	11.50 to 11.75
Brass, heavy	9.00 to 9.25
Brass, light	7.25 to 7.50
Heavy machine composition	11.75 to 12.00
Clean brass turnings	8.50 to 8.75
Composition turnings	9.75 to 10.00
Lead, heavy	4.20 to 4.25
Lead, tea	3.90 to 3.95
Zinc scrap	5.00 to 5.25

Central and South American Notes.

SAN JUAN, C. A., October 20, 1909.—There seems to be a chance now for the settling of the Chile-Peru-Bolivian muddle, and incidentally the payment of certain long standing American claims for damages.

One of the best commercial moves lately heard of is that of several American bankers, who propose establishing banking agencies in Spanish-America and especially in Argentina. The Argentine republic is certainly one of our greatest rivals in the production of wheat and beef, and the latter's by-products. Argentina's trade per capita of population is more than twice that of the United States. The exports of corn this year amount to nearly 5,500,000 tons. England exported its manufactured products to the value of many millions to Argentina last year; in iron, steel and machinery the exports were nearly $30,000,000 worth. Nearly all the Argentine railroad bonds and shares ($720,000,000) are now held in Great Britain.

We often, in the United States, excuse ourselves for not doing more business in Spanish-America, by alleging that revolutions are the cause. Remembering that there are 20 independent republics to the south of us, the revolutions are now relatively infrequent and are restricted to four or five out of all these countries. Furthermore, almost any of our strikes cause more general damage and bloodshed than a revolution in Latin-America. The truth is that many of our manufacturers, bankers and other business men generally must rise to the vast business opportunities now to be found in our southern sister republics.

The matter of preparing special goods for these foreign markets cannot be touched upon too often, such as the packing for countries which have few railroads; the size, weight and even the shape of each package must be considered. Of course they do things differently in these Spanish countries, but a man must never go there thinking that the business men are stupid or untrustworthy, for no greater mistake could be made. Responsible British, German and French bankers will testify that the average Spanish-American business man's word is always as good as his bond. In some of these countries such things as business failures are almost unknown. Any number of millions are loaned to Spanish-Americans yearly by Europeans, at high rates of interest; this has been going on for many years, but rarely is a complaint heard as to their business integrity. These statements may seem too highly colored, but they can surely bear investigation.

Several hundred miles of railroad will have to be rebuilt in the Tehuantepec region of Central America, especially on the Three-America's Railroad. This is due to the heavy flood in that region, and will, of course, retard the progress of the line toward the south for a while. Shipments of railroad material are already arriving at San Benito on the Pacific and Coatzacoalco on the Gulf coast.

Things are unsettled in Nicaragua, and not a few Americans have claims on the Government. It seems probable that the other States will keep out of the muddle.

Peru's government has made a number of retrenchments in its yearly expenses, so that there will be no deficit this year, and some look for a small surplus instead.

The bonds of the State of Sao Paulo in Brazil, lately put on the market ($75,000,000), are making a good showing for the credit of this State. In general all Brazilian, Chilian and Argentine bonds are very firm.

In the Panama Canal region there has been a great deal of talk about Japan's desire to construct a rival canal in co-operation with Colombia, the former owner of the Panama Canal. The Atrato Canal scheme is really not at all new, this section having been surveyed by European engineers 30 or 40 years ago. Some of them liked it better than either the Panama or Nicaragua routes. It is said that Engineer Undurraga of Colombia has been pushing the scheme in London especially and that he is backed by many of the Colombia Congressmen. Of course Japan could have nothing to do with this rival scheme; otherwise where would the Monroe doctrine come in? C.

October Copper Production and Stocks.

The Copper Producers' Association has issued its regular monthly statement. The figures for October compare as follows with those for September:

	October. Pounds.	September. Pounds.
Stock of marketable copper of all kinds on hand at all points in United States at beginning of month	151,472,772	135,632,565
Total production	124,657,709	118,023,139
Deliveries for consumption and export	122,620,855	102,182,932
Stock on hand at close of month	153,509,626	151,472,772

The October deliveries for domestic consumption were 66,359,617 lb., and for export were 56,261,238 lb.

Large New Ore Docks at Cleveland.—The Pennsylvania Railroad Company, according to an announcement made at Pittsburgh last week, will begin work early in 1910 on new ore docks at Cleveland, Ohio, to be of concrete and steel, and to cost over $4,000,000. The present Cleveland & Pittsburgh Railroad docks of the Pennsylvania interests, located on Whiskey Island, Cuyahaga River, are inadequate, and are less easy of access than the new docks will be, since the latter are to be built on the Lake Erie front. This will make it possible for the largest lake freighters to unload with a dispatch not possible to vessels which enter the river. The project contemplates also the dredging of the lake from the deep water line to the docks, and the laying of a number of tracks on the docks, so that the steamers can unload directly into cars. In addition to this the docks will have large storage facilities, to be used when cars are not available. Extensive ore handling equipment of the most modern type will be installed.

Standards for Keys and Keyways.—The Engineering Standards Committee, 28 Victoria street, London, S. W., has issued report No. 46, which deals with standard keys and keyways. There are two sections. The first is a specification for the steel bars from which the keys are to be cut, and the second deals with the proportions of keys and keyways recommended. The specification requires a minimum tensile breaking strength of 36 tons per square inch, with an elongation of 12 per cent. on the test piece specified. A list of standard sizes is given and the margins of manufacture to be allowed on merchant bar are defined. In the second portion of the report standard sections for sunk keys, taper and parallel, are given, based on data obtained from engine builders and others, supplemented by the results of experiments by the committee. Recommendations are made also as to tolerances on the finished key and keyway.

The F. B. Shuster Company, New Haven, Conn., has supplied the new French and German plants of the International Harvester Company with two of its automatic wire straighteners and cutters and two of its elastic rotary and blow riveting machines. The company is now very busy, running nights, in the execution of an order from the American Steel & Wire Company's Cuyahoga plant, for four more of its automatic sheet metal straighteners and cutters, of which that plant now has three. These machines are for handling metal up to 14 in. wide, straightening and cutting it to lengths. The company has brought out a larger size of its helix coiling machines, taking ⅝-in. stock and making coils 40 in. in diameter.

The Panama Tank Company, New Orleans, La., has, as a result of the good roads movement in the South, received contracts for the making of corrugated galvanized metal culverts for the cities of Huntsville and Andalusia and also for Tift and Calhoun counties, Ala., and the city of Quitman and Mitchell County, Ga. The company has several similar contracts pending for places in the States of Alabama, Georgia and Louisiana.

The Machinery Trade.

NEW YORK, November 10, 1909.

Machinery merchants are much gratified at the volume of business received the past week. The demand was quite active and covered practically all classes of tools, there now being general buying participated in by manufacturers of all kinds of products for which metal working machinery is used. This kind of business is considered more satisfactory to the seller than that prevailing a few months ago, when the automobile builders, who use only certain classes of tools, were the main factors in the market, or when the bulk of the business was made up of extensive lists of tools, in that better prices can be secured and it is easier to complete the transaction because of less competition. When the smaller buyers are active business is apt to be steadier and more healthful. Just these conditions appear to prevail at the present time. Inquiries for single and small lots of tools are very numerous, but no large lists are reported. Aside from the International Steam Pump Company, which has made further purchases of importance, the larger interests have not come into the market for any notable lists of tools. The railroads are still inactive and have given no intimation of coming into the market to any extent at an early date. Deliveries in some tools are becoming more extended, and the tendency of prices is upward. Steam specialty houses report a better demand.

The Western Maryland Railroad has prepared plans for several additions to its shops at Hagerstown, Md., including machine shop, 40 x 50 ft., and blacksmith shop, 50 x 50 ft. About $25,000 will be spent in making the improvements. H. R. Pratt is chief engineer, with headquarters at Baltimore, Md.

Some new machinery will likely be required by the Norfolk & Southern Railroad to replace that lost in the fire which burned its shops at New Berne, N. C., November 6. The roundhouse, foundry, blacksmith and boiler shops, two locomotives and some cars were badly damaged. Included in the loss, which is estimated at $200,000, is new machinery valued at about $20,000.

The Fraser Lock Bar Pipe Company, 50 Church street, New York, has inquiries out covering a line of special machinery and general machinery equipment for a plant it proposes to erect at Sharon, Pa. The company will install a power plant of about 550 hp., and it has not been decided yet as to the character of the power equipment other than that it will be gas. Whether a gas producer plant will be installed or the gas will be furnished by other interests has not been determined.

Additional machinery will be required by the Virginia Bridge & Iron Company, Roanoke, Va., to equip the addition it intends building. This addition will be erected at a cost of from $130,000 to $150,000, and it is hoped to have it completed by January 1.

The General Electric Company has awarded contracts for the construction of the several additions to its plant at Schenectady, N. Y., including a reinforced concrete building, 80 x 400 ft., five stories, and an extension to building No. 50, 200 ft. long. The company has recently made a number of important improvements to its various plants and in the past few months has purchased a great deal of additional machinery.

Through the efforts of Ralph Loper of Port Jefferson, N. Y., the Only Car Company has secured a site in that town, where it will erect plant to contain about 16,000 sq. ft. of floor space. The plant will be located on the Long Island Railroad and will be equipped with modern machinery operated by electricity. M. Francois Richard, an expert automobile engineer,well known in both this country and France, will have charge of the construction and operation of the plant. The output will consist of two, three, four and five passenger cars, taxicabs and light delivery wagons, for which orders in hand are in excess of the capacity of the plant for the first year.

R. & J. Dick, Glasgow, Scotland, manufacturers of leather belting, are to erect a plant in Passaic, N. J., to supply the demand for their product in the United States. The J. J. O'Leary Company, New York, has the contract for the construction of the buildings.

A new central generating station, the prime movers in which will be Corliss engines or steam turbines, with turbo jet condensers, has been decided upon by the St. Petersburg (Fla.) Electric Light & Power Company. Among the requirements will be boilers, steel stacks, automatic stoker furnaces, pumps, feed water heater, generators, exciters, switchboard apparatus, transformers, converter, lightning arresters, &c.

The State Canal Board, Albany, N. Y., has approved plans for barge canal contract No. 44, for the construction of about 7 miles of canal about 1500 ft. west of Mud Creek, Oneida County, at an estimated cost of $1,926,093. It is likely that bids for this work will be advertised at an early date.

Contracts have been signed for the construction of the six sections of the Fourth avenue subway in Brooklyn, and it is understood that work on these sections will be begun as soon as is possible. The construction of this subway will likely necessitate the purchase of considerable contractors' equipment at an early date.

Construction or extension of pumping plants for water supply and sewage systems is proposed at Mansfield, Ohio; Mediapolis, Iowa; Alexandria, La.; Cuero, Texas; Collingswood, N. J.; Cuthbert, Ga.; Sabetha, Kan.; Mt. Vernon, N. Y.; Waterloo, Iowa; Dayton, Wyo.; Stamford, N. Y.; Carbon Hill, Ala.; St. Johns, Kan.; Carrington, N. D.; Summit, Ill.; Benton, Ill.; Valentine, Neb.; South Biltmore, N. C.; Cambridge, Pa.; Portage La Prairie, Man.; Cherokee, Okla.; Trail, B. C.; Oila, Kan.; Stamford, N. Y.; Tunica, Miss.; Toppenish, Wash.; Bountiful, Utah; Conway, Pa.

Plans are under consideration for electric light and power plants, including possible franchises to be granted private corporations, at Clinton, Ill.; Festus, Mo.; Rowley, Mass.; Grand Forks, N. D.; Hill City, Kan.; Cozad, Neb.; Broken Bow, Neb.; Towner, N. D.; Pocomoke City, Md.; Ellendale, Del.; Cherokee, Okla.; Laurens, Iowa.

Construction of new electric railway lines will be undertaken by the New Castle & Beaver Valley Street Railway Company, Beaver Falls, Pa.; Bedford, Fulton & Franklin Street Railway Company, Bedford, Pa.; Elizabethtown Railway Company, Elizabethtown, N. Y.; Pueblo & San Luis Valley Railroad & Power Company, Pueblo, Colo.; Louisville, Blue River & French Lick Traction Company, New Albany, Ind.; South Bend & Logansport Traction Company, South Bend, Ind.; Capital Circuit Traction Company, Greenfield, Ind.; Texas Union Traction Company, Paris, Texas; Richmond-Henrico Railroad Company, Richmond, Va.; Waldo Street Railway Company, Rockland, Maine; Salem, Eugene & Eastern Railway Company, Salem, Ore.; Memphis, Collierville & Clarksdale Electric Railway, Clarksdale, Tenn.; Lake Washington Electric Railway Company, Seattle, Wash.; Uvalda & Batesville Street Railway Company, Uvalda, Texas; Belleville & Chester Electric Railway Company, Chester, Ill.; El Paso & Ft. Hancock Railway Company, El Paso, Texas; Coffeyville & Nowata Railway & Power Company, Nowata, Okla.; Indianapolis & Logansport Traction Company, Delphi, Ind.; Cincinnati, Madison & Western Traction Company, Madison, Ind.

Catalogues Wanted.—D. Tshudy, 6 West King street, Lancaster, Pa., desires catalogues from manufacturers of soap making machinery, including boilers, tanks, cutters, stamping and molding machines, &c.

Philadelphia Machinery Market.

PHILADELPHIA, PA., November 9, 1909.

While the undertone of the local machinery market continues strong, the volume of actual business transacted by merchants has not been as large as was generally expected. Business under consideration does not close up as rapidly as the trade would desire, and prospective purchases have in some instances been deferred. There is, however, quite a large amount of equipment under consideration and more is in sight. The bulk of the business transacted has been in the nature of single tools or small lots, but a few exceptions are noted. An automobile manufacturer in this territory has purchased a number of tools, while a moderate equipment has been taken by another purchaser in this immediate vicinity. Delayed deliveries are causing considerable concern to representatives of makers, who are pretty well filled up for near future deliveries, as opportunities to make sales are frequently lost on that account. Inquiries for tools of a general nature are still quite plentiful, although more shopping round by buyers is noted, particularly when the number of tools wanted is small, and delivery is now beginning to play an important part in the consummation of an order. Machine tool manufacturers report a fair run of business; while there have been no exceptionally large orders placed, the aggregate volume of business coming to makers from various sections of the country continues of good size. Heavy tools are in better demand, particularly those which are of a more special nature. Plants are constantly becoming better engaged and are, in many instances, adding to their working forces, although a scarcity of good mechanics is frequently reported. Crane builders in this territory report a steady increase in business, and the majority of the shops are now operating at close to normal capacity. Little business has yet developed from the railroads, al-

though increased activity at the various railroad repair shops in this vicinity is noted. Railroad orders for motive power and rolling stock continue to come out, and, with heavy orders placed and in sight, makers of materials entering into their manufacture are practically insured activity in operations for some time.

The demand for tools and equipment for export has not been active. Makers of transmission machinery have taken a few orders, but the demand for machine tools of the so-termed standard types still drags. Business in power transmission specialties continues on a fairly even basis. With deliveries hardening for some classes of machine tools, a slight betterment in the demand for second-hand machinery and tools is anticipated. So far, however, second-hand machinery merchants report business as only of fair proportions. Transactions are largely of a day-to-day character and cover a pretty general range of tools. Second-hand engines are still inactive. The demand for second-hand boilers, however, is reported as being somewhat better. Builders of new power equipment, particularly boilers and engines of the medium horsepowers, are fairly active and report prospective conditions as more favorable.

The general foundry conditions are steadily improving. Steel casting plants are booking more contracts, and prices are showing an upward tendency. Shipyards, car works and locomotive builders are placing more business with the steel casting makers. Gray iron foundries making machinery castings are better engaged; jobbing foundries are taking on more work, and the trade on the whole looks forward hopefully to full capacity conditions.

The Bethlehem Steel Company, South Bethlehem, Pa., is purchasing a number of heavy machine tools for its plant, which include one of the largest sized planers made.

The Hall Gas Engine Company, Frankford, has let a contract for the erection of a reinforced concrete testing shop, 30 x 60 ft., for assembling and testing gas engines. A few minor tools will be required for its equipment, which, however, the company is not yet ready to consider.

Paul P. Ripian, Allentown, Pa., has recently purchased a number of machine tools for use in connection with the manufacture of automobiles.

The Philadelphia Roll & Machine Company reports an improved demand for both sand cast and chilled charcoal iron rolls, for which several satisfactory orders have been taken. More business in general mill machinery is under consideration than has been the case for some time, and the prospects are that a larger volume of business of that character will be transacted in the near future.

F. A. Havens & Co. have been awarded the contract to build a new car shop for the Harlan & Hollingsworth Corporation, Wilmington, Del. The building is to be 172 x 200 ft., and will be largely of concrete construction.

Proposals have been opened by Chief Dunlap of the Bureau of Water for furnishing and installing the necessary machinery in the Queen Lane filter station, which is now being constructed. The bids received were: N. O. Bayard & Co., $76,000, to be completed in 120 days; J. F. Buchanan & Co., $81,888, time 200 days; D'Olier Engineering Company, $84,370, time 150 days, and Penn Engineering Company, $95,000, time 150 days. Several other bids were received for different items in the schedule, which include traveling cranes, hydraulic and centrifugal pumps, high pressure engines and electrical generators. Bids have been ordered scheduled and awards will be announced in the near future.

Dienelt & Eisenhardt, Inc., note a steady increase in the volume of business. Orders recently taken include two for heavy oilcloth printing machines, one of which is for shipment to Canada. A class B pipe expanding machine is being built for the Solway Process Company, while one of the same type was recently shipped to the Brooklyn Navy Yard. Business in the company's several other specialties has been good, and the increasing business has necessitated a considerable increase in working forces.

The Energy Elevator Company notes a very good inquiry for its various lines of elevators. Trade in this immediate territory has been fair and there have been a good number of orders for hand power elevators from customers in the Southern and Western States. Recent orders taken include one for an electric freight elevator for Trenton, N. J., while one of the same type is being installed for a local purchaser.

The Link-Belt Company, Nicetown, reports a very good run of orders coming from the New England, Middle, Western and Southern States, as well as from this immediate territory. Orders for chain and bucket elevators, Renold and Maximum silent chain drives, bucket and screw conveyors, have also been received for export. Orders for machinery for several locomotive coaling stations, retail coal pocket equipments, coal and ashes handling apparatus, coal and culm handling machinery, roller flight conveyors, industrial railroad systems, sand conveyors, as well as a large quantity of special equipment for handling and elevating materials of various characters are noted. Maximum and Renold silent chain drives are being furnished to a number of industrial plants. From the volume of orders noted conditions with the company are evidently very much improved.

New England Machinery Market.

BOSTON, MASS., November 9, 1909.

The improvement in business among the dealers is accelerating more rapidly than at any time since the depression. Totals are very satisfactory, in some cases equaling those when prosperity was last at its hight. Orders are received from an increasing variety of industry. Inquiries that have been pending for months are now developing into actual business. It will take very little more to bring the average demand upon the machinery trade throughout New England up to the high records which were reached three years ago. While no very large lists are in sight, so far as can be learned, some very nice business will be placed in the next fortnight. Other lines are being added to those which cannot give early deliveries, which interferes somewhat with sales. The manufacturers of machinery report an entirely satisfactory condition. The special feature now is that foreign trade is showing greater life, which will be yet another factor in putting the demand ahead of the supply.

Woodworking machinery is in strong demand, especially for the planing mills, in all parts of the country. The builders of these classes of machinery, who have been in attendance at the recent meeting of the woodworking machinery builders, state that reports from those present indicate an increasing business, with the promise of much better things in the early future. One of the largest of the works, that of the S. A. Woods Machine Company, South Boston, is running at full capacity, with abundant orders for the machines in which the company specializes, notably those for planing mills.

There is a noteworthy absence of signs of unrest in those branches of labor which enter into the metal trades. Wages are high, and contentment appears to prevail everywhere. It is not to be expected, of course, that labor troubles should develop so soon after two lean years, yet as compared with other similar periods the conditions seems exceptional, which is a cause for the congratulation of both employers and employees.

The Pratt & Whitney Company, Hartford, Conn., is about to erect a new building, which will be devoted to the small tool department. It will be 50 x 110 ft., three stories.

The New Britain Machine Company, New Britain, Conn., will build a five-story structure, which will be used for tool room, stock room, blacksmith shop, &c.

The Wheeler Rotary Engine & Power Company, 191 Hanover street, Meriden, Conn., has been organized with a Connecticut charter to manufacture an engine of new design. The authorized capital stock is $200,000, and the incorporators are W. W. Wheeler, W. H. Way, G. E. Bicknell and Fred Rees, all of Meriden. The company is now building a demonstrating engine, designed to develop between 200 and 300 hp.

Edward L. Mills, formerly superintendent of the Blaisdell Machine Company, Bradford, Pa., has been made secretary and treasurer of the Fitchburg Machine Works, Fitchburg, Mass.

A new corporation, the Hinsdale Power & Mill Company, is organizing at Hinsdale, N. H., with the purpose of establishing works in that town for the manufacture of automobile parts, such as ball bearings, axles and gasolene engines and transmissions for marine and automobile use. The company owns what are known as the Haile & Frost mills, and the new business will occupy the premises if the plans are carried out. It is stated that moneyed interests of the town are anxious to bring the project to a successful culmination.

The American Motor Company, Brockton, Mass., manufacturer of motorcycles, has begun the erection of a two-story addition to its shops, 50 x 100 ft., and has tentative plans for another similar structure. The company has been buying some machine tools and has made inquiries with the purpose of placing additional orders.

The Taylor Machinery Company, Boston, Mass., dealer in machine tools, has taken the store at 42 Oliver street, which will be occupied after January 1, when removal will be made from the present office in the Oliver Building. The company will carry in its showroom the Champion lathe, built by the Champion Tool Works Company, Cincinnati, Ohio; drills of the Hoefer Mfg. Company, Freeport, Ill; radials of the Fosdick Machine Tool Company, Cincinnati; shapers of the Queen City Machine Tool Company, Cincinnati, and planers of the W. A. Wilson Machine Company, Rochester, N. Y. The company has the exclusive New England agency of the steam hammers built by the Erie Foundry Company, Erie, Pa., and will also handle Rochester helve hammers, Bradford lathes, Armington electric hoists and Browning cranes, the product of Victor R. Browning & Co., Cleveland, Ohio, and Hercules portable cranes.

The trade is interested in the proposed sale of the equipment of the American Motor & Engine Company in the plant at Hyde Park, Mass., occupied formerly by the Napier Motor Company.

The important announcement is made that the business of the Providence Machine Company, Providence, R. I., has been acquired by the Whitin Machine Works, Whitinsville, Mass. The plan of the new owner, as stated, is that the Providence plant will be abandoned and the equipment moved to Whitinsville, where new buildings are now under construction. Both companies build cotton working machinery. The Providence Machine Company is an old business, the charter having been issued in 1867. Certain of its machines have achieved a high reputation, and the purchase gives to the Whitin Company a still more complete line. Some 235 persons are employed in the Providence shops. William C. Peirce is the president and Thomas P. Davis treasurer, while C. W. Lasell is the president and G. M. Whitin the treasurer of the Whitin Machine Works.

The Hydro-Carbon Company, New London, Conn., manufacturer of a device designed to permit of the use of crude oil in gasoline engines, is contemplating increasing its works on Water street, now used as an experimental plant.

Announcements of enlarged manufacturing facilities in industries outside of the metal trades, include the following: Sidney Blumenthal & Co., Shelton, Conn., silks and velvets, will increase hight of buildings purchased of the American Brass Company, formerly occupied by the Osborne & Cheeseman Company, and will erect new buildings on the property; D. E. Loewe & Co., Danbury, Conn., hats, addition, 30 x 50 ft., three stories; Lothrop & Walker, Leominster, Mass., combs, factory, 40 x 50 ft., three stories; Thomas Barrett Company, Hartford, Conn., woodworking shop, 33 x 60 ft., nature of power undecided; Summit Thread Company, East Hampton, Mass., automatic sprinkler system, with 60,000 gal. tank capacity; Farwell Mills, Lisbon, Maine, weave shed, 54 x 150 ft.; J. & J. Cash Company, South Norwalk, Conn., textiles, new building on land just purchased.

The Leighton Machine Company, Manchester, N. H., manufacturer of knitting machines and other textile machinery, proposes to erect a new plant in that city on the line of the Portsmouth Railroad, at East Manchester, where a site has been purchased. The building will be two stories, 40 x 250 ft., with two wings. Work will not begin until spring, however. The company occupies a building under lease at the present time, and this will be abandoned when the new works are ready for occupancy.

The Rae Electric Vehicle Company, Springfield, Vt., has been organized to build a new type of electric automobile and has acquired a site for works on the river, some distance below the new shops of the Jones & Lamson Machine Company. It is stated that a plant of considerable size will be erected. The company is named for the inventor of the automobile which will be manufactured. H. K. Parkman, Springfield, is interested in the project.

The Charles Greiner Company, Nash and Eagle streets, New Haven, Conn., has brought out a new high speed riveting machine. Charles Greiner, the head of the business, has had 25 years' experience with John Adt & Son and the F. B. Shuster Company.

The Plymouth County Gas, Light & Power Company proposes to erect a gas plant at Braintree, Mass., to cost $1,000,000, with the purpose of supplying gas to the Massachusetts towns of Weymouth, Rockland, Abington, Whitman and Braintree, and to extend the system ultimately to the towns of Cohasset, Randolph, Hingham, Hull and Holbrook. The original towns call for the installation of 7703 services, requiring 40 miles of No. 6 main and 60 miles of other sizes. In asking the Massachusetts Gas & Electric Light Commission for the necessary rights to issue stock, the company states that the firm of Thomas Nevins & Sons, New York, agrees to build the plant and system complete, for $600,000 of stock and $400,000 of bonds of the company, the amounts named in the petition.

The Williams Sealing Corporation, Waterbury, Conn., has taken a factory in that city and will manufacture bottle and jar caps. Orders for the initial outfit of machinery have been placed. John H. Goss is the president, George A. Williams treasurer and general manager and Nathaniel R. Bronson secretary.

The addition to the industrial building at Capitol avenue and Laurel street, Hartford, Conn., owned by A. C. Dunham, will comprise raising the present building one story. The main building is 65 x 225 ft., with two sections 35 x 65 and 40 x 50 ft. respectively.

The Acme Burglar Proof Cabinet Company, Bridgeport, Conn., has been organized to manufacture a burglar proof cabinet. E. P. Nobbs is president and treasurer, and James T. Delaney secretary, while the third incorporator is N. P. Bissonnette, 176 Park street, who is the principal owner.

The Stanley Works, New Britain, Conn., has placed contracts for a new factory to be erected at Niles, Ohio. One building will be 80 x 200 ft. and the other 72 x 170 ft. The machinery and stock from the old plant which the company has been occupying at Girard, Ohio, will be moved to the new works and additional machinery installed for making lines of heavy hardware.

James H. Woodward, who was for many years connected with Benedict & Burnham, and for four years was secretary of the Waterbury Brass Goods Company, Waterbury, Conn., and associates have bought the stock of Homer B. Bronson in the Homer B. Bronson Company, Beacon Falls, Conn., which manufactures piano, organ and other hinges and miscellaneous small brass work. The business will be continued along the same lines as heretofore, and will be materially extended. Joseph H. Woodward is president and treasurer, and Carlile B. Tuthill, secretary, who with John Booth Burrall constitute the Board of Directors.

The Vanderbeek Tool Company, Hartford, Conn., which has been renting part of a factory, is to erect a small plant for its own use.

The Atlas Shear Company, Bridgeport, Conn., broke ground last week for a two-story 60 ft. addition to its plant to be used for manufacturing purposes.

Chicago Machinery Market.

CHICAGO, ILL., November 9, 1909.

The machinery trade shows a very steady and satisfactory growth from week to week and buyers are beginning to exhibit more concern regarding deliveries than prices. Striking proof of this improvement in trade conditions is found in the success of leading manufacturers in obtaining moderate advances in their prices, and concurrent with this is a general stiffening in values in all machine tools as well as a growing scarcity of second-hand machines. While the automobile manufacturers are less active in seeking new equipment, and the lull in this branch of the trade is felt by houses which have specialized along this line, there is a broadening activity in other directions which, on the whole, has resulted in a larger volume of new business. There are more inquiries for lathes, shapers, planers, boring mills and general lines of machine tools, and it is understood that in some lines, lathes for example, an advance in prices to take effect in the near future is under consideration. The course of the trade makes it quite clear that metal working manufacturers in general contemplate a material increase in their facilities and equipment, and their confidence in the future is evident in view of the fact that many orders which have been taken by machinery houses call for delivery as late as next May, although earlier deliveries could be given. Such instances are undoubtedly connected with plans for factory extensions or improvements where the new buildings contemplated will not be ready until the dates fixed for shipment in these orders. The difficulty in securing second-hand machines also throws some light on the character of the new business taken by machinery houses, as it shows that most of the equipment now being sold will go to enlarge the capacity rather than to replace old machines. On the whole conditions are very satisfactory from the standpoint of the machinery houses, and the delay in obtaining shipments to fill orders has not, except in a few lines, reached a point where it has proved a serious embarrassment to prospective purchasers.

Some of the machine tool houses are finding profit in extending their lines to include auxiliary shop equipment which can be conveniently handled in conjunction with machine tools. McDowell, Stocker & Co., Chicago, who recently secured the agency in Chicago territory for the product of the New Britain Machine Company, New Britain, Conn., reports a good demand for portable vise stands, cast iron bench legs and other forms of metal shop furniture made by this concern. New factory buildings are being constructed very largely of fireproof materials, and to attain this end in the fullest degree the elimination as far as possible of all combustible material in the interior finishing is highly desirable. Instead of wooden stock racks heretofore commonly used in shops and storehouses for bars, finished and semi-finished parts, &c., steel forms are being substituted. Besides being fireproof such equipment is usually less cumbersome and tends to economize space.

A development of notable interest in the machinery trade is the contemplated construction of a new factory by the Weller Mfg. Company, Chicago, now located at 116-126 North avenue, where it has been established for 23 years. The new plant will be erected upon a recently purchased tract, 556 x 600 ft., at the southwest corner of North Forty-fourth avenue and Cortland street. It is the purpose of the company to begin construction at once, and, because of the overcrowded condition which limits production in the present quarters, every effort will be made to have the new plant ready for occupancy at the earliest possible moment. The initial buildings, which will be of steel and brick, with saw tooth roof and concrete floors throughout, will cost not less than $125,000, and plans already drawn provide for still further expansion in the immediate future. The equipment of the present plant, which is adapted to the production of elevating, conveying and power transmission machinery, will comprise part of the equipment of the new works, but further purchases will be necessary since the new works will treble the capacity of the company.

The Denver & Rio Grande Railroad Company, Denver, Colo., has purchased $30,000 worth of new machinery, which will be installed at the Alamosa, Colo., shops of the company in the near future.

The H. E. Wilson Motor Car Company, Minneapolis, Minn., is erecting a new factory building, 65 x 250 ft., four stories and basement, to be used for the assembling of cars to be built for the season of 1910. The building now occupied by the company will be used exclusively as a machine shop, in which will be installed quite a number of automatic machines, orders for a large portion of which have already been placed. It is understood that the company will make still further purchases. Inquiries should be addressed for the attention of C. E. Fox.

The Atlas Iron Works, Denver, Colo., owned by William Burkart, has taken over the plant formerly occupied by the Vulcan Iron Works, at 1709-15 Blake street, the latter company having moved into a new location at Seventh street and West Colfax avenue. All equipment such as lathes, steam hammers, punches, &c., to be installed by the new company has been secured through local dealers, the only machine purchased outside being a 15-ton No. 7 Ajax bulldozer.

The Cedar Rapids Auto Company, Cedar Rapids, Iowa, is erecting a fireproof garage, 60 x 140 ft., which will be equipped with every convenience necessary for the repair of automobiles. The repair shop will be located in the basement and the main floor will be used for display and garage purposes.

The Marlin Ice & Electric Company, Marlin, Texas, has in the course of construction a fireproof factory building, the estimated cost of which is $70,000. The company advises that it is buying a considerable amount of new equipment, only a part of which has been contracted for.

Plans for the rebuilding of the factory of the American Tool Works, St. Joseph, Mich., recently destroyed by fire, are well under way, and it is expected to have the new building ready for occupancy by November 15. It is stated that all of the machinery which passed through the fire will be rebuilt, but the company advises that it desires to purchase a small machine shop.

The Springfield Motor Car Company, Springfield, Ill., has been incorporated with capital stock of $100,000, all of which has been paid in, and will break ground in the near future for the erection of a new factory, 110 x 220 ft., one story, of brick construction, in which the most modern machinery will be installed. It is the intention of the company to have its output on the market by January 1, 1910. The officers are as follows: H. C. Medcraft, president; Robert Haas, vice-president; H. E. Staley, secretary, and A. H. Rankin, treasurer.

The Veerac Motor Company, Minneapolis, Minn., recently incorporated with capital stock of $50,000, advises that negotiations are under way for the erection of a factory, but no definite arrangements have been made as yet. As soon as the plant has been secured, however, the company will install all necessary equipment. The officers are: Virgil Dillin, president; W. E. Decker, vice-president; F. K. Sullivan, treasurer, and W. A. Zaloudek, secretary.

The Rock Island Mfg. Company, Rock Island, Ill., incorporated with capital stock of $50,000, all of which has been paid in, has taken over the factory, stock and business of the Rock Island Tool Company of that place, which recently went into bankruptcy. The new company will manufacture the line of vices, tools and gray iron castings made by the latter company. It is the intention of the company to install considerable new machinery and make other improvements, which will materially increase the output of the plant. The officers of the new company are: Sidney Adler, president and treasurer; C. E. Shields, secretary and manager.

The Reliance Elevator Company, Chicago, manufacturer of passenger and freight elevators, has removed from 329-331 La Salle street to 312 West Ontario street, where the works occupy all of the space in a five-story building.

Bids are being received by John J. Hanberg, Commissioner of Public Works, 200 East Randolph street, Chicago, for the construction of a pumping station to cost $150,000 at 104th street and Stewart avenue, Chicago.

D. W. Beldon, sales engineer of the Westinghouse Electric & Mfg. Company, at Tucson, Ariz., has been made manager of the El Paso, Tex., office.

Milwaukee Machinery Market.

MILWAUKEE, WIS., November 9, 1909.

Trade for November has thus far been very encouraging, and buying is now more general than at any previous period. Every line of the metal working industries shows great activity. All except the very largest shops are working with full force, and January 1 will see places, at least, for as many men as the capacities of the various plants can accommodate. Whether there will be skilled operatives for them is a question, as the scarcity of such labor becomes more serious from one week to another. Even unskilled workmen are difficult to obtain in many localities. Out in the State isolated shops advertise for help almost in vain: machinists can only be secured at considerable premium over the usual rates, and so keen has the competition become in some quarters that men who have only just been engaged at one plant are tempted to leave for another where a better offer is posted. Manufacturers of motor vehicles and agricultural implements, or parts therefor, are among the greatest sufferers from the practice, which they were themselves the earliest to inaugurate, when they enticed away the tool makers and more skillful machinists of the machinery builders. Some of the latter say that it is a judgment upon them.

As a barometer of industrial development the demand for machinery used in the generation, transmission and application of power has long been considered here to be at least fully as reliable as the condition of the iron and steel trade. Consequently, it is of interest to note that manufacturers of such apparatus report a rush of buying orders from every section of the country, particularly the South and Northwest.

In addition to the closing of many large contracts, negotiations for some of which have been long pending, there is a very considerable percentage of business from unexpected sources, which consists mainly of small orders from numerous factories, mills, foundries and other industrial plants in which facilities for an increased or improved output are being provided.

Jobbing houses that cater to machine shops, boiler works, fabricating plants and foundries have more than they can do at present to meet inquiries for tool specialties, patented attachments, and other relatively small apparatus. As a rule orders for these come in singly and they are always wanted by return delivery.

Iron and steel men continue to buy heavily, not only for the blast furnaces and mills, but also for the mines, ore handling plants and docks. A noteworthy feature of this trade is the purchase of elevating, breaking, screening and conveying machinery for iron ore, dolomite and limestone crushing plants; also magnetic separators, coke pulverizers and carriers, semiautomatic loading and unloading devices, &c. Other apparatus used at the mines has been mentioned in detail before and it need only be added that the demand has increased. Hoists and air compressors are particularly wanted. In contrast, however, to the general tendency among practically all other lines, prices for the material named in this paragraph are either holding or declining, rather than advancing, and the cheaper, lighter types of construction seem to be preferred, where it can be demonstrated that they will stand up to the service. As one iron mine operator recently put it, "There is too much cast iron or steel used in machinery simply for the purpose of giving weight, where it is not in line with the working stresses."

The principal stockholders in the Wisconsin Engine Company have bought a controlling interest in the Owen Thomas Motor Car Company, Janesville, Wis., and the capital has been increased to $500,000. A new plant will be built at Corliss, Wis., near the engine works, and equipped with the best machinery obtainable. Tool builders and manufacturers of hydraulic pressure machinery would do well to follow up this lead at once.

The capital stock of the Northwestern Iron Company, Milwaukee, has been increased to $2,000,000, with the object of providing funds for additional improvements now contemplated. With the other Schlesinger properties, the Newport (iron) Mining Company and Milwaukee Coke & Gas Company, this concern is doing a very profitable business, and a number of by-products controlled by subsidiary companies are also showing good returns. All of these will be heavy buyers of equipment the coming year.

Boilers, engine, generator, motors and electric elevator will be needed for the new factory of the Cooper Underwear Company, Kenosha, Wis., purchases to be made a little later.

Another vertical triple expansion pumping engine, with lift of 12,000,000 gal, daily, will be purchased by the city of Milwaukee for the North Point station. Bids are to be taken until November 16.

A factory building, equipped with power machinery and some light special tools, will be erected by the Badger Traveling Goods Company, Milwaukee.

In addition to the new machine shop, 50 x 300 ft., which is practically completed at the works of the Fred M. Prescott Steam Pump Company, West Allis, Wis., a forge shop, 35 x 50 ft., sand storage, 20 x 200 ft., and oil house, 20 x 20 ft., are to be built; all will involve an expenditure of over $50,000. For the past few months the company has been so rushed with orders that it has had to work night and day shifts. Even with the additions that are under way, and that are being arranged for, it will not be able to do away with its night shift. The company makes large draft pumps for waterworks stations, deep mines and for general service in industrial plants.

The J. M. Kohler Sons Company, Sheboygan Falls, Wis.,

will erect a large addition to its enameling department and build a power plant of considerable capacity.

Veneer saws, motor driven, will be required by the Port Washington (Wis.) Lumber & Veneer Company, recently incorporated.

A number of bridges will be built by the city of Superior, Wis., along the route leading from the center of town to the site of the Minnesota Steel Company's works.

A new power plant to cost $200,000 will be erected at once on the site of the building wrecked by the boiler explosion at the Pabst Brewing Company's brewery. The Worden-Allen Company has the contract for the structural iron and steel work. Specifications for the new boilers and other equipment can be obtained shortly by addressing the company directly.

An addition to the woodworking plant of the Badger Sash & Door Company, Milwaukee, will be built immediately, necessitating the purchase of some new machinery.

An addition, 60 x 90 ft., two stories, will be made to the factory of the Henry Schock Company, Milwaukee, trebling its capacity for vehicle manufacture.

A machine shop for engines, truck and fire boat repairs is under consideration by the Milwaukee city authorities.

The Odee & Koto Mfg. Company, Beloit, Wis., has started to build gas engines.

It is reported from Superior, Wis., that the Soo road, which recently gained entrance to that city, will build large ore docks there.

Prof. D. W. Mead, University of Wisconsin, Madison, who was recently engaged by the Alpena Power Company, Ltd., Alpena, Mich., has completed plans for a large hydroelectric plant on Thunder River. It is understood that the General Electric Company will be given preference on the generators.

The equipment of the Milwaukee Boiler Company is being thoroughly overhauled and some additions will probably be required in the near future, owing to the pressure of current business.

The export trade in engines of the J. I. Case Threshing Machine Company, Racine, Wis., has grown to such proportions that it is found necessary to erect a new building, with power plant adjoining, in which to assemble these machines and prepare them for shipment. A traveling crane, pneumatic tools and other equipment, besides power machinery will be needed.

A large quantity of machinery for grinding, pressing and refining, together with power equipment, several pumps, gas producers, compressors, &c., will be purchased in the spring by the Wisconsin Sugar Company, for a new plant to be erected at Fond du Lac, Wis. A small repair shop, with lathe, drill press, grinder, &c., motor driven, will probably be located in the basement of the power house.

Boilers for a new heating plant, 40 x 70 ft., also blowers, will be purchased for one of the county buildings at Sparta, Wis.

The F. J. Greene Engineering Works, Racine, Wis., whose projected extension was mentioned last week, will need additional power machinery. The inclination at present is toward installing a gas producer, gas engine, electric generator and motors; but a boiler plant and Corliss engine may be substituted.

Charles H. Besley & Co., Beloit, Wis., manufacturers of brass specialties and machinists' tools, are planning an addition to their plant.

From Kansas City it is reported that the Allis-Chalmers Company, Milwaukee, has been awarded contract for a 25,000,000 gal. pumping engine to be installed there in the Quindaro station. It will be built at the West Allis works.

An electrical system of controlling unloading operations has been decided upon by the Berwind Fuel Company for a 600-ft. extension of its docks at Superior, Wis.

Boiler, engine and woodworking machinery will be required by Dresden Brothers, Sauk City, Wis., as the result of an addition to be made to their shop.

Ground has been broken for an extension of the Standard Electric Company's works at Racine, Wis. Machinery used in the manufacture of vacuum cleaners will be added to the company's present equipment.

Cincinnati Machinery Market.

CINCINNATI, OHIO, November 9, 1909.

Satisfactory conditions noted in former letters regarding the machine tool trade in this market now seem to be more uniformly distributed throughout all branches of the tool industry. For a considerable time it was the tool used most in the automobile industry that had the best run—such as the milling machine, the lathe, the upright drill and the boring and grinding tools—but the past week or two has developed a splendid inquiry and induced some good sales among the manufacturers of electric (portable) tools, shapers, radials and planers. In lathes, the small and medium sizes are still the best sellers, the greatest demand being from the 24 in. type down and in the milling machines, the automobile manufacturers have been heavy buyers of the standard No. 2 and 3 sizes with a fair demand for the No. 4 types. It is only within the past two or three weeks that the dealers have cut any figure in the trade generally; the direct business coming from automobile industries in such volume and so suddenly as it did, kept all forces engaged so that the stock floor had to suffer.

Now tool manufacturers have succeeded in putting their plants back into normal running condition with such help as they could find, and are finding some opportunity to make up machines for stock. Local establishments have had some very good business the past week or ten days with the larger steel and iron manufacturing concerns, particularly the former, which are running full blast in all sections.

The question of skilled labor is still agitating the machine tool and general machinery trade. Secretary John E. Manley of the Cincinnati branch, National Metal Trades Association, notes the largest "requests for lathe hands, vise hands, planer hands," &c., from members that he has recorded since the establishment of the office. Other manufacturing industries also note the scarcity of help. President Lucien Wulsin of the Baldwin Piano Company, who so handsomely entertained excursionists on the Industrial Bureau visitation last week, sent to that organization a suggestion that the bureau inaugurate as a special feature of its work the attracting of labor to the city, declaring that Cincinnati manufacturers can use 10 per cent. more labor than she has available.

The statement made by Mr. Wulsin, repeated in a number of Eastern papers, has brought a deluge of applications. These were tabulated and turned over to the Industrial Bureau, and this organization will in future make the attraction of desirable labor to the city a special feature. President S. P. Egan will name a special committee which will work out the details with Secretary and Manager W. L. Finch.

Along with the gradual locating of the plants making up the factory colony at Oakley, the new Cincinnati manufacturing suburb, plans are maturing for the building of homes in which the employees will live. One of the largest sales since the original deal whereby seven or eight large machinery companies established their plants there was made during the week. Thomas McEvilly, president of the First National Bank of Norwood, Ohio, purchased 39 building lots, with a frontage of about 1200 ft., and on these it is understood that the purchaser will erect dwellings.

The Manufacturers' Club has determined upon an aggressive policy for the coming year and will plan some very large and characteristic meetings with guest speakers from the lists of the country's greatest manufacturers, jurists and specialists. W. F. Robertson of the W. F. Robertson Iron & Steel Company was recently elected president; Murray Shipley of the Lodge & Shipley Machine Tool Company and A. R. Betts of the Cincinnati Coffin Company, vice-presidents; A. W. Williamson of the Peck-Williamson Company, treasurer, and Chester F. Korn, secretary.

The Sebastian Lathe Company, Covington, Ky., has determined to enlarge its plant considerably and this week will, in consultation with its architects, determine upon the extent and character of the improvements. It has just purchased seven lots adjoining its property and will erect an addition. The company expects to be ready for business in its new part by February 1. Some new machinery will be purchased.

The R. K. Le Blond Machine Tool Company reports an entirely satisfactory business, with a good demand for the medium and smaller sized lathes and some inquiry for heavier sizes in lathes, gear cutters and milling machines. This company has had some exceptionally large orders from automobile concerns and is working full force and time.

The Norton Machinery Company, which has conducted a large local business in engines, boilers and power machinery generally at a West Sixth street location, with three or four branches in different parts of the city, has acquired the quarters at Baymiller and Hathaway streets just vacated by the Triumph Electric & Ice Mfg. Company, and will utilize the entire place as headquarters for all its interests. This will include the Western Machinery Company, which makes a specialty of machine tools and general machinery. The new quarters will contain about 45,000 sq. ft. The repair department will be specially fitted out with motor driven machinery.

The Ohio Shovel & Tool Company has been incorporated at Zanesville, Ohio, with a capital stock of $10,000, by W. E. Lloyd, Edgar E. Bagley, Harry C. Meyers, Bertie S. Young and A. M. Goodwin.

Ernest Troike of Sandusky, Ohio, a railroad man, has invented and patented a new gasoline engine and is said to be seeking a site for the erection of a plant to manufacture the engine.

Samuel E. Kishler of Aurora, Ill., is reported to be interested in the securing of a site and plant for the manufacture of automobile motors.

It is reported that John W. Kiser, the Chicago automobile manufacturer, may purchase the Walborn & Riker

carriage factory at St. Paris, Ohio, and remodel it into an automobile manufacturing plant. Mr. Kiser makes St. Paris his summer home.

Galion, Ohio, is interested in an effort to secure for that city a large automobile manufacturing concern now located in New York State.

Indiana capitalists headed by George W. Watkins have visited Sandusky, Ohio, seeking a location for a motor truck plant.

A merit system has been introduced among the engineers of the various pumping stations comprising the Cincinnati water works by President Robert Laidlaw of the Board of Public Service. Mr. Laidlaw is connected with the Laidlaw-Dunn-Gordon Company, now a part of the International Steam Pump Company, and his knowledge of the technical side of pumping and engineering machinery has been of great service.

Dealers report satisfactory conditions, with the balance in favor of the higher grades of machinery and tools. There is a steadily increasing demand for Corliss engines of the heavier types, and the boiler business is reported to be improving constantly. All dealers note a tendency on the part of buyers to select the higher grades and types. There is little second-hand business reported.

The foundries are all engaged and for the most part to the full limit of their capacities. It is likely that an effort will soon be made by leading melters to rearrange the contracts under which they are now making castings for the tool concerns, claiming that their margins of profit are too small under the present heavy pressure and increasing costs.

It is announced from Frankfort, Ind., that the Great Western Smelting & Refining Company of Chicago has determined to reopen and put in operation the Frankfort Brass Works, which has been in the hands of a receiver for a year or more. The plant is to be operated by a lessee company. This new company is to use electricity as motive power and has asked the city for a rate on current. It is said that if this is satisfactory the plant will be in operation by December 1.

The Ft. Wayne (Ind.) Electric Works is reported to be now working on extra time in every department.

Word from Elkhart, Ind., indicates that the New York Central lines have begun the preliminaries looking to the erection of a large locomotive shop in that city and that active work is to be commenced in the spring.

Cleveland Machinery Market.

CLEVELAND, OHIO, November 9, 1909.

All the local machinery houses report a good volume of orders. Often the first week in the month is comparatively quiet, but November started out with an active demand and indications point to a very satisfactory month. The market has gradually broadened and the demand has become so diversified that the volume of business has become more steady, showing less fluctuation from week to week. Another satisfactory condition of the market at present is that orders are being placed promptly and inquiries usually result in sales in a very short time. During the past few months it frequently happened that inquiries would not result in the placing of orders for several weeks. Now inquiries almost always result in quick sales if satisfactory deliveries can be secured. In the matter of deliveries early shipments can be secured on nearly everything but milling machines, although some sizes of lathes have become rather scarce for prompt delivery. The tools most in demand at present are lathes, punch presses, milling machines and drilling machines. The demand for drop forge shop equipment has become very active, and a number of forge plants in this city and vicinity that are under contract for a large amount of automobile work for the coming season are placing orders for additional hammers for increasing the capacity of their plants. A good volume of business is also coming from other makers of automobile parts. Business from large manufacturing plants in various industries is showing a gradual improvement. Many of these plants are now running at full capacity and with all their present equipment in operation they are placing orders for a few additional tools. There is also a good demand for machinery to equip new small machine shops, many of which are springing up.

The demand for second-hand tools is very good, but the supply has become quite scarce.

In the foundry trade the demand for light gray casting continues very good, and local foundries are running at practically full capacity. The demand for heavy iron castings and steel castings shows a steady improvement, and local foundries making these castings are running from 80 to 100 per cent. of their full capacity.

The United Factories Corporation, recently incorporated at Akron, Ohio, announces that it will manufacture a new line of furnaces, heaters and heating stoves, equipped with the company's patented natural and manufactured gas, crude and refined oil burners. The company is now fitting up a temporary plant in Toledo, Ohio, where it will begin to turn out its products within 30 days. The company announces that it is planning the erection of two plants, one of which will probably be located in the East and the other in the Southwest, and it will enter into negotiations with commercial bodies for locations for its permanent plants. The company will be in the market for foundry equipment, machinery, a nickel plating plant and for everything else needed in fitting up a first class plant. Communications should be addressed to E. H. Blackstone, secretary, room 11, Doyle Block, Akron, Ohio. T. E. Moore, Arona, Pa., is president and general manager of the corporation.

The Millersburg Furnace Company, which established a plant at Millersburg, Ohio, last spring for the manufacture of hot air furnaces, announces that it will remove its plant to Canton, Ohio, where it will occupy the plant of the Royal Foundry & Machine Company at 1169 Marion street. The company expects to have a much larger plant in order to increase its output and has increased its capitalization from $10,000 to $50,000. C. E. Alexander of Akron is president and Fred Finger of Massillon secretary.

The Sabin Machine Company, 5714 Euclid avenue, has in view the erection of a new shop that will give the company considerably more room than it has at present. The company is in the market for two second-hand lathes, and will probably buy further equipment when it adopts definite plans regarding a new plant.

The Sanitary Stair Tread Company, Akron, Ohio, has been incorporated with a capitalization of $15,000 to manufacture a metal clamp for fastening down stair carpets. The officers are W. B. Waugh, president; A. Yerrick, vice-president; A. T. Witzman, secretary and treasurer. The company expects to start a plant.

The Cleveland offices of the Pratt & Whitney Company and the Niles Tool Works were removed the past week from 662 Rose Building to 314 Rockefeller Building.

The Corbett-Stevens Company, Columbus, Ohio, has been incorporated with a capitalization of $50,000 by M. A. Corbett, F. E. Stevens, H. M. Schaff, H. E. Stafford and C. H. Hoffhine to make railroad car seals, gas and water seals, &c.

The National Steel Products Company, recently organized by Cleveland and Lorain men, has purchased the old Company B auditorium on North Broadway, in Lorain, which it will fit up at once for a manufacturing plant. The company will make spark plugs.

It is announced from Akron, Ohio, that the City Ice & Coal Company of that city, just incorporated for $10,000, will soon begin the erection of an ice making plant. Gus Burkhardt, E. J. Alderfer and others are the incorporators.

The Overland Automobile Company, Toledo, Ohio, has awarded a contract for the erection of another addition to its plant. It will be 92 x 150 ft., three stories and a basement. The building will be used for assembling purposes.

The machine shop of the new Clow pipe plant at Coshocton, Ohio, was placed in operation last week. The plant is nearing completion and will soon be placed in full operation.

Government Purchases.

WASHINGTON, D. C., November 9, 1909.

Bids will be received until November 15, at the office of the Chief Quartermaster, San Antonio, Texas, for two outside center packed duplex pumps for the pump house at Fort McIntosh, Texas.

The following bids were opened November 2 for supplies for the navy yards:

Class 21. Four 3-hp. chain ammunition hoist motors, with spare parts—Bidder 51, Diehl Mfg. Company, Elizabethport, N. J., $1781.80; 67, General Electric Company, Schenectady, N. Y., $1924.14.

Class 152. Twelve hydraulic jacks—Bidder 13, Bailey-Libby Company, Charleston, S. C., $972.50; 66, Fairbanks Company, New York, $718.20; 94, J. B. Kendall Company, Washington, D. C., $653; 123, Manning, Maxwell & Moore, New York, $818.70 and $724.10; 127, Motley, Green & Co., New York, $970.60; 131, Montgomery & Co., New York, $726.40; 172, H. A. Rogers Company, New York, $732.

The following bids were opened on October 26 for a locomotive fog signal boiler for use either at Matinicus Rock light station, Maine, or Boston light station, Mass., as may be deemed most expedient when the boiler is ready for installation:

Robb-Mumford Boiler Company, South Framingham, Mass., $710, accepted; Roberts Iron Works Company, Cambridge, Mass., $787; E. Keeler Company, Williamsport, Pa., $800; Portland Company, Portland, Me., $1208.

The battleship North Dakota, built by the Fore River Shipbuilding Company, Quincy, Mass., and equipped with Curtis turbines, in its standardization tests developed a speed of 22.25 knots an hour and an average of 21.833 knots, making it the fastest battleship afloat. A maximum of 35,150 hp. was recorded. The coal consumption was considerably less than that of its sister ship, the Delaware, equipped with reciprocating engines.

HARDWARE

Preventing a Demoralized Market

DURING the recent depression, with its restricted demand and temptation to manufacturers to cut prices for the sake of getting business, there was more than at any similar period a disposition to act conservatively, with a desire to sustain the market as a whole and not exclusively in view of their own separate interests. There was not the old-time ruthless competition and lowering of prices for the purpose of securing orders that might be within reach. The result has amply justified the wisdom of this course. Never before in the history of the trade was the market so well sustained instead of being permitted to go to pieces. The benefit of this condition and disposition was felt all along the line, and the fruits of it are seen in the early and nearly complete recovery under which the country now rejoices.

The Perils of Too High Prices

With the return of good times it is well to remember that there is still an opportunity for the exercise of wisdom, and that now, as then, wisdom may be shown in resisting a natural tendency in trade. As it was good policy a year or two ago to keep values from too radically declining, so now it is the part of wisdom to keep them from climbing too high. The undesirability of a boom market is generally recognized. There are, indeed, good grounds for regarding the drift towards too high prices as more perilous in the long run than a declining market, which, with its unavoidable discomfort, is frequently after all advantageous, and contributes to the healthfulness of trade and the general welfare. It is, however, a striking fact that it is far easier to steady a weak market and prevent demoralization in it than it is to check the advance of prices when there is an insistent demand and an upward tendency in values. The declining market may sometimes be restrained by conservative and concerted action of comparatively few manufacturers, but a rising market has behind it the pressure of a multitude of buyers whose urgency often forces prices upward, in spite of sincere and earnest efforts on the part of manufacturers to keep them on a reasonable level.

Popularity of Hardware Insurance

During the past few years the progress and development of the Hardware mutual insurance companies has been rapid and impressive. The merchants of the country are evidently becoming convinced that these companies, conducted as they are under the direction of men of standing and responsibility in their respective communites, are entitled to confidence and worthy of support as a distinctive feature of the Hardware trade. Organized as they were to win recruits for the Hardware associations of various States, they have fulfilled their mission admirably, and the growth of many of the State bodies and their present commanding position has been largely due to the attractions held out by the cheap and safe insurance which might thus be secured. It is estimated that something like $150,000 annually is saved to the Hardware merchants of the country who carry policies in the Hardware mutuals, and not a few individuals doing an extensive business are ahead to the extent of several hundred dollars a year as a result of placing insurance with the different companies. Among those who are availing themselves of this form of insurance are many houses of high standing who in this as in the general conduct of their business follow a conservative and careful policy. It certainly seems to be up to all Hardware merchants who have not as yet obtained insurance from one or more of the Hardware mutuals to look into the matter. A saving of from 25 to 50 per cent. of the annual premium should be worth while.

Condition of Trade.

The higher prices ruling for iron and steel are having a perceptible effect on the cost of the finished products. As a result of this condition manufacturers are scrutinizing their cost and selling prices carefully, and considering the course to be pursued. In many cases where the material is an important part of the cost an advance is necessary, and in most heavy goods this has already taken place. More of this upward movement may doubtless be expected, especially in lines in which there has been an insufficient recognition of the changed conditions and the trend toward higher values. In many lines of Shelf and Miscellaneous Hardware in which the increased cost of producing the goods is not as yet pronounced there is the strengthening of tone which comes from the advances which are taking place in other directions, and from the more active demand which practically every manufacturer experiences. In this state of things there are many withdrawals of special concessions in price and slight advances here and there to certain classes of trade, even where there has been no general and open revision of quotations. The change which has come over the market is shown in the satisfied manner in which manufacturers express themselves in regard to their business and the confidence with which they are looking forward to trade during the remainder of this year and during 1910. Some of them are experiencing difficulty in securing prompt deliveries of material, owing in some cases to the fact that the mills are seriously behind their orders and also to delays in transportation, indicating that the railroads are beginning to be overtaxed. The trouble in getting material is, however, not as yet a serious matter, and is not indeed encountered by all manufacturers, as some of them are still getting supplies with reasonable promptness. Much depends on the character of the material and the extent to which their needs were anticipated by timely orders. It is, however, not unlikely that the difficulty will increase, especially as

winter comes on and interferes with transportation. There is much activity among manufacturers in preparing for future business, as there is a very general expectation that next year will be characterized by a large volume of trade. The growing probability of a scarcity in many lines is recognized by the merchants as well as the makers of Hardware. In this condition of things, where many goods have advanced, some of them materially, a fine opportunity is afforded the jobbing houses to realize good profits on their generally ample stocks purchased at previous low figures. There is, however, a good deal of cutting of prices, in the sense that the jobbers are not following the manufacturers in the advances which have occurred, preferring to give their customers the advantage of a good part of the advance which has taken place. There is thus some unevenness in the prices at which retail merchants are buying, and in some lines this is causing the manufacturers some embarrassment even to the extent of preventing the announcement of advances which the cost of making the goods would justify.

Chicago.

The feature of the Hardware trade which merits careful consideration of buyers is that current prices for the leading lines of Hardware are lower than last year or in 1907, while the market values of pig iron and steel are very strong and have been advancing rapidly in recent months. In a general way this is due to the fact that jobbers are distributing Hardware made from iron and steel which the manufacturers purchased last spring and summer when the market for these materials was at the lowest level of recent years. It is more than probable, and, in fact, practically certain, that higher prices will prevail in the near future when the manufacturers have exhausted their supplies of low priced material and are compelled to readjust their schedules to the higher level of values in iron and steel which now prevail. A leading Western Hardware house recently sent out to the trade a circular which makes a comparison of the prices of Bessemer pig iron and billets for the past three years with prices at which dealers have been buying Wire products and Sheets at Pittsburgh. While Wire Nails are lower now than in October of 1907 or 1908, Cut Nails are higher and reflect more directly the strength at the present time in the iron and steel market. Inquiries among leading jobbers elicit a consensus of opinion that Wire products in general are likely to be higher next year, and in some quarters it is expected that the base will be in the neighborhood of 2 cents, Pittsburgh. In Galvanized products there is likely to be an immediate readjustment of values if the recent advance in Spelter is maintained. Many of the mills have already made an advance of 25 cents per 100 lb. on No. 28 Galvanized Sheets to cover the increase in the cost of Spelter, which amounts to about $4 per ton, and it would seem inevitable that a similar readjustment of values will be made in other Galvanized products. The demand for Galvanized Wire Nails has been growing rapidly in recent years, owing to their advantages for roofing and similar purposes.

NOTES ON PRICES.

Wire Nails.—The market continues in a satisfactory condition, with prices unchanged, though there is a feeling among the trade that an advance may possibly take place before spring demand opens. This consideration is perhaps influencing some of the jobbing trade, who are placing orders for future delivery, although their stocks are not yet exhausted. A fair volume of business is being received by the mills. Quotations continue as follows: F.o.b. Pittsburgh, plus actual freight to point of delivery, 60 days, or 2 per cent. discount for cash in 10 days:

Carloads, to jobbers	$1.80
Carload lots to retail merchants	1.85
Less than carloads to jobbers	1.85
Less than carloads to retail merchants	1.95

New York.—Wire Nails are not moving from jobbers' hands quite as freely as a week or so ago, but the demand is moderately fair. Prices continue to show some irregularity as the result of portions of unsold stocks of cheap Nails, but in small lots at store the general quotation is on the basis of $2 per keg.

Chicago.—No change has been announced in prices of wire products and the trade is moving along steadily, with a fair volume of new business from jobbers. Many of the jobbers have comfortable stocks for their current needs, but are disposed to place new business in the expectation that higher prices will prevail next year. We quote as follows: $1.98, Chicago, in carloads to jobbers, and $2.03 in carloads to retailers, with an advance of 10 cents for less than carloads from mills.

Cut Nails.—The market on Cut Nails is firm enough so that manufacturers are not inclined to make concessions in price to enlarge their sales. Buyers are sending specifications on contract orders, which are being shipped by the mills, and some new business is also being received. Quotations are on the basis of $1.80 to $1.85, in carload and larger lots, f.o.b. Pittsburgh.

New York.—Cut Nails are not in as large demand as are Wire Nails at the present time. The general quotation is $2 per keg, base, in small lots at store, but some unevenness in the market is caused by stocks of cheaper Nails.

Chicago.—The demand continues fairly active, with a notable increase in orders from railroads for car work. Prices are firm and jobbers' stocks are moving freely. We quote in car lots to jobbers, Steel Cut Nails, $1.98 to $2.03; Iron Cut Nails, $2.08 to $2.13.

Barb Wire.—The volume of new business being placed with mills continues light. The market is firm at the following quotations, f.o.b. Pittsburgh:

	Painted.	Gal.
Jobbers, carload lots	$1.80	$2.10
Retailers, carload lots	1.85	2.15
Retailers, less than carload lots	1.95	2.25

Chicago.—The favorable weather throughout the West and Northwest has created an unusually good volume of late fall trade in Barb Wire and Wire Fencing, as the farmers have been able to work on improvements which might otherwise have been deferred until spring. Prices are unchanged here and business is very satisfactory. We quote as follows: To jobbers, Chicago, carloads, Painted, $1.98; Galvanized, $2.38. To retailers, carloads, Painted, $2.03; Galvanized, $2.33; retailers, less than carloads, Painted, $2.13; Galvanized, $2.43. Staples, Bright, in carloads, to jobbers, $1.98; Galvanized, $2.28; carloads, to retailers, 5 cents extra, with an additional 10 cents for less than carloads.

Fence Wire.—Demand from manufacturers of fences has shown itself in heavy specifications on contract orders. In expectation of a large spring business in this line liberal orders have been placed for future shipment. The market is firm at regular quotations, as follows: To jobbers in carload lots on a basis of $1.60 for Plain and $1.90 for Galvanized, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days, the usual price to retailers being 5 cents additional:

Nos.	0 to 9	10	11	12 & 12½	13	14	15	16
Annealed	$1.60	1.65	1.70	1.75	1.85	1.95	2.05	2.15
Galvanized	1.90	1.95	2.00	2.05	2.15	2.25	2.65	2.75

Chicago.—Specifications from manufacturers of fencing have been very heavy this fall, and in some cases complaint is heard because they cannot get prompt shipments, but on the whole there is not much difficulty on this score. Spring trade promises to reach a very large volume and the fence makers are preparing for the expected activity by placing specifications early with the mills. We quote as follows: Carloads, to jobbers, $1.78, base, f.o.b. Chicago.

Crayons.—Soapstone and Talc Crayons are firm at current prices, owing to the greatly increased demand on orders freely given by rolling mills and other consumers of these products. There is expectation of a further hardening in price by the beginning of the new year, owing to scarcity of raw material. It is customary to accumulate stock to tide over the winter months as far

as possible, because of the difficulty of transporting the material by wagon over almost impassable roads 16 miles to the factory of the principal manufacturer. There are but few sources of supply in this country of suitable talc and some of these are unavailable on account of flooded mines.

Comparison of Prices.—Hibbard, Spencer, Bartlett & Co., Chicago, mailed a circular to the trade recently calling attention to the fact that Wire products and Sheets were sold in October at lower prices than in October, 1907, or 1908, while Bessemer Pig Iron and Billets were higher in October, 1909, than in October, 1908. Their table of comparisons is as follows:

October Current Prices for Car Loads f. o. b. Pittsburg.

	October, 1907.	October, 1908.	October, 1909.
Bessemer Pig Iron, per ton	$22.60	$16.65	$19.90
Bessemer Billets, per ton	28.25	25.00	27.00
Wire Nails, per 100 lb	2.00	2.00	1.85
Galvanized Barb Wire, per 100 lb	2.45	2.45	2.15
No. 9 Annealed Wire, per 100 lb	1.85	1.85	1.65
Fence Staples, per 100 lb	2.10	2.10	1.85
No. 28 Galvanized Sheets, per 100 lb.	3.65	3.55	3.45
No. 28 Black Sheets, per 100 lb	2.55	2.55	2.45

Copper and Brass Material.—There are as yet no definite increases in price on Copper and Brass Materials, but the outlook is decidedly better. The buying is by consumers rather than for speculative account, and the trend is toward a larger volume of business. There is a good demand for present requirements and orders are being booked for future delivery. None of the manufacturers are saying much about it, but the outlook is better than it was. The Brass mills appear to be busy, but Copper Wire products have not kept pace with Sheet Copper, in which there is a good business. The base prices are about as they have been since last spring, with a few comparatively unimportant changes, and are as follows:

	Per pound base.—Cents.
Copper Sheets	17
Copper Wire, carloads at mill	14½
Copper Tubing, seamless	22
Brass Tubing, seamless	18
Brass Tubing, brazed	20⅝
Brass Rods, high	14½
Brass Wire, high	14½
Brass Sheets	14½

Sash Cord.—The opinion in the trade is that with raw cotton on the present level there must be a higher price for Sash Cord, and regret is expressed that the recent advance was but a half of what conditions justified in the estimation of makers. Six cents per pound is the figure named as necessary to be added to the price of cotton yarn from which Sash Cord is made, which at current prices is said to be 21½ to 22 cents per pound. Allusion is also made to the price of raw cotton now, in excess of 15 cents, in contrast with raw cotton a few years ago at 11 cents per pound, when Sash Cord was 25 cents per pound. The waste alone in manufacture is placed at 15 per cent. Sash Cord in moderate quantities is now obtainable at 27 cents per pound, but jobbers who laid in good stocks at low prices are making lower figures.

Cotton and Twine Mops.— Cotton Mops have recently been moved up ¾ cent per pound, the market being represented by prices of 8 to 8¼ cents per pound. Twine Mops are likewise higher, there being a range of 13 to 13½ cents per pound, according to quality.

Cotton Waste.—Cotton Waste on November 5 advanced ½ cent per pound. This was caused by the scarcity of the raw thread material from which it is made, which, in turn, is attributed to the fact that some of the textile mills are operating on reduced time. The price for best grades, which was 7¾ cents, is now 8¼ cents per pound. The market rates varying with the quality ranges from 6 to 8¼ cents per pound.

Twine, Lath Yarn, &c.—As indicative of prices which are made on Twines, &c., to retail merchants by a jobbing house in this line, the following quotations are given. The prices on Twine are for full bale or barrel lots, and smaller quantities would command higher prices:

Nos.	18	24	36	48 & 60
Dark Hemp Twine	$0.12½	$0.12	$0.11½	$0.11
Light Hemp Twine	.13½	.13	.12½	.12
B. C. Flax Twine	.17	.16½	.16	.15½

¼-lb. Balls, ½ cent per pound additional.

Nos.	4½	5	6	7	8
Dark India Twine	$0.08½	$0.09½	$0.08½	$0.08	$0.07½
Light India Twine	.10	.11	.10	.09½	.09

Sisal Hay Rope, per pound, 9 cents.
Sisal Lath-Yarn, per pound, 6½ cents.
A quality Wool Twine, per pound, 6 cents; B quality, 5½ cents.

Rope.—The Cordage market is in about the same condition as reported last week. The demand is continuous and in fairly large volume without sign of diminishing. The continual strength of manila fiber will probably result in an advance in Manila Rope, if manufacturers consider that demand is large enough to justify naming higher prices. The market is represented by the following quotations: Pure Manila of the highest grade, 8 to 8¼ cents per pound; lower grades of Pure Manila, ¼ to ¾ cent less than the foregoing quotations. Pure Sisal of the highest grade, 7¼ to 7¾ cents per pound, base; Commercial grade, 6¼ to 6½ cents per pound. Rove Jute Rope, ¼ in. and up, No. 1, is quoted at 5 to 5½ cents per pound.

Window Glass.—The Glass market still waits on the uncertainty as to the formation of the Imperial Window Glass Company. Manufacturers have been trying to get higher prices for their product and have hinted to large buyers that it was a good time to buy. Buyers, however, continue a waiting policy, and are only making purchases to cover nearby requirements. In a few instances buyers have profited by the manufacturers' need of cash to keep factories running, and have thus obtained more favorable prices than otherwise. But manufacturers as a rule appear to have confidence in the ultimate success of the project. It is understood that it is the co-operative factories that are holding out in the hope that the Imperial Company will be formed, and they can then get business by cutting prices enough to dispose of their output. The promoters of the company are apparently unwilling to face this discordant element, but have not ceased their efforts to bring the co-operatives into the organization. Should the Imperial project eventually fall through a scramble for business would probably result in the demoralization of the market. The Eastern Window Glass Jobbers' Association has recommended an advance of about 5 per cent. on both single and double strength Glass in New England territory and in the State of New York. Otherwise discounts are unchanged from jobbers' list of October 1, 1903, as follows:

New England territory: Single, 90 and 25%; double, 90 and 30%.
New York State: Single, 90 and 25%; double, 90 and 30%.
New York State, factory shipments: Single, 90 and 30%; double, 90 and 35%.
Southern States: Single, 90 and 20 to 90 and 30%; double, 90 and 25 to 90 and 40%.

Spirits Turpentine.—An easier Southern market and light business at this point has caused quotations to drop off about 3 cents per gallon during the week. The demand has been confined to jobbing lots. New York quotations are unchanged as follows: Oil Barrels, 58 to 58½; Machine Barrels, 58½ to 59 cents.

Linseed Oil.—The demand for Flaxseed at primary points is said to have settled down to legitimate requirements, the speculative features having been eliminated. The Seed market continues strong, and arrivals are not yet large enough to satisfy the demand from crushers. Oil is not accumulating in crushers' hands, as it is shipped as fast as it is in condition to leave the factory. The demand is for small lots, but this is sufficient to keep supply at a minimum. The Crop Reporting Board of the Department of Agriculture in a preliminary report recently issued gives the average quality of Flaxseed at 92.1 per cent., against 91.4 in 1908, and the preliminary estimate of the average yield per acre as 9.4 bushels, against 9.6 bushels as finally estimated in 1908. According to this report, the quality and yield of Seed are both below 1908 estimates. The actual crop of 1908 proved to be considerably below the estimates, and if there is a proportionate falling off this year the crop is

likely to be two or three million bushels less than the normal requirements of this country. One of the large crushers made a cut price in the carload price of Oil last week to 60 cents base for Western Raw. Five-barrel lots are quoted at 61 to 62 cents. Boiled Oil is one cent per gallon advance on Raw.

Oilers.—The advances which have taken place in the price of some kinds of Oilers enable the jobbers, who purchased at the low prices recently ruling, to undersell the manufacturers, and some irregularity results in the prices which are current throughout the trade. It is understood, too, that some of the jobbers have liberal unexecuted orders at the figures recently prevailing and have thus covered their requirements for some time.

Drip Pans.—With the increased cost of the raw material prices on Drip Pans are somewhat higher than a month or two ago, and the market is represented to buyers of fair lots by a discount of from 75, 10 and 5 per cent. to 80 per cent.

Malleable Fittings.—This is one of the lines which feels promptly the higher prices ruling for iron and an advance of moderate extent has been made by some of the manufacturers.

Price-Lists, Circulars, Etc.

Manufacturers in Hardware and related lines are requested to send us copies of new catalogues, price-lists, &c., for notice in this column and for filing in our Catalogue Department.

PHILADELPHIA LAWN MOWER COMPANY, 3101-3109 Chestnut street, Philadelphia, Pa.: Annual illustrated catalogue and price-list for 1910 of the company's line of Hand and Horse Power Lawn Mowers, Grass Collectors, Lawn Sprinklers, Horse Lawn Sweepers, Horse Boots, &c. A majority of the Lawn Mower illustrations are in colors.

C. E. JENNINGS & Co., 42 Murray street, New York: Forty-page illustrated Tool Chest catalogue, showing Tool Chests, Tool Cabinets, Corner Cabinets for Tools, Electricians' and Carpenters' Tool Cases and Chests, Machinists' Tool Cases and a large variety of Chests and Cabinets for various kinds of mechanics, both complete with Tools and empty. Metal corners for Tool Chests and four styles of Wood Miter Boxes are also shown.

LUDLOW-SAYLOR WIRE COMPANY, St. Louis, Mo.: Catalogue No. 41, relating to the Perfect Double Crimped Steel, Brass and Copper Wire Cloth, for mining and manufacturing purposes.

S. L. ALLEN & Co., Philadelphia, Pa.: Planet Garden Implement catalogue, illustrating Flexible Flyer Coasters, Wheel Hoes, Seeders, Cultivators and Plows, Horse Hoe, Cultivator, Hiller, Harrows, &c.

ABERCROMBIE & FITCH COMPANY, 57 Reade street, New York: Catalogue illustrating Outfits for Sportsmen, covering Automobile Supplies, Tents, Camp Furniture and Sundries, Cameras, Canoes, Clothing, Firearms and Sundries, Fishing Tackle, Sporting and Athletic Goods, &c.

PAYSON MFG. COMPANY, 2920 Jackson boulevard, Chicago, Ill.; Eastern salesroom, 101 Reade street, New York: Catalogue devoted to the following styles of Casters: Anti-Friction, Ball Bearing, Double Wheel, Stationary, Swivel, Piano, Furniture and Truck.

INDIANA MFG. COMPANY, Peru, Ind.: Refrigerators. A catalogue is devoted to the company's line of Indiana Refrigerators and Ice Chests for domestic use; also for grocers. Another catalogue relates to its North Star Refrigerators, with enameled provision chambers and woven wire shelves; also to Ice Chests.

MARLIN FIREARMS COMPANY, New Haven, Conn.: Catalogue devoted to Rifles, Shot Guns, Carbines, Muskets, Rust Repeller, Ammunition, Reloading Tools, Sights, &c.

Obituary.

George Fuller.

GEORGE FULLER of Fuller Brothers & Co., New York, died November 8 of pneumonia, in his seventy-eighth year. Mr. Fuller was born August 13, 1832, and his first business experience was with the old Novelty Iron Works, then located on the East River. About 1852 he came into the office of W. B. Fuller & Co., afterward Fuller & Lord, where he remained for about 10 years, when he went to Boonton, N. J. In 1876 Fuller, Lord & Co. sold out all interest in the Nail property at Boonton, but he continued to live there for about 20 years longer. The house of Fuller Brothers & Co. was formed in 1876, of which George Fuller was the senior member, the firm so continuing until January 1, 1909, when the business was incorporated, with Mr. Fuller as president. It is notable that in a period of many changes Mr. Fuller spent 50 years of his life in the same business and at the same New York address, 139 Greenwich street.

After leaving Boonton Mr. Fuller resided in Norristown. In 1862 he went to the war as a second lieutenant in the Twenty-second Regiment, and a year later became a captain in the same organization. He belonged to the Century Club, New York, and some local clubs in New Jersey.

Mr. Fuller was a courtly gentleman of the old school and of the highest character, and greatly respected by all with whom he came in contact.

Harvey L. Anderson.

HARVEY L. ANDERSON, president of the Anderson Hardware Company, Atlanta, Ga., was run down by an automobile and killed on November 6. Mr. Anderson was 37 years old and for several years had been president of the Anderson Hardware Company, a large wholesale and retail Hardware house. Mr. Anderson entered the Hardware business about 15 years ago and worked his way to the top from a humble position. He belonged to the Capital City, Piedmont Driving and Atlanta Athletic clubs, and was a member of the Shrine and other fraternal organizations. He was held in high esteem as a rising and successful merchant of character and ability, with an unusually attractive personality.

James D. Green.

JAMES D. GREEN, a valued official of the Supplee Hardware Company, Philadelphia, Pa., died November 9 at his home in that city. Mr. Green was a director of the company and general manager, standing high in the estimation of business and social acquaintances, and was especially well liked by manufacturers' representatives, by whom he was regarded as a high grade man of business.

For many years Mr. Green was identified with the Biddle Hardware Company, from which years ago he went to the Supplee Hardware Company, where he was at the time of his death. About October 1 he contracted a severe cold, from which he did not recover. The funeral will be from his late residence, 34 South Fifty-first street, Friday, November 12, at 2 p.m.

The Coates Hardware Company has purchased the business of H. H. Champlin, Enid, Okla., and is carrying Shelf and Heavy Hardware, Stoves, Tinware, Window Glass, Agricultural Implements, Paints, Oils and Sporting Goods.

The firm of Moore & Coleman, Bunceton, Mo., has been succeeded by Moore & Couchman, who will continue the business, handling Hardware, Tin, Stoves, Harness, Saddles, Windmills, Farming Implements, &c.

Edward Blake & Son have opened a store in Johnson City, Tenn., and are handling Shelf Hardware, Stoves, Tinware, House Furnishings, Window Glass, Paints, Oils and Sporting Goods.

An Elaborate Thanksgiving Window.

Primitive Display of an Indiana House

A BACKWARD glance of 10 years or more emphasizes the higher standard which is now aimed at in window displays, and those who have employed the more modern methods cannot well fail to recognize the larger and more satisfactory business returns. The alert merchant finds that the time, energy and attention put into window dressing are fully justified by the results of his enterprise.

In the Thanksgiving window, shown herewith, which

Thanksgiving Window Arranged by the Jones Hardware Company, Richmond, Ind., with Canvas Background Painted in Water Colors.

was arranged last year by the Jones Hardware Company, Richmond, Ind., the background was of canvas, with the woodland scene painted in water colors, as was also the canvas log cabin. The Puritans were wax figures in full Puritan dress. Corn stalks which had been carefully pulled out by the roots were set in real earth. Two shocks of corn taken from the field were set up in the foreground and the whole scene was made as nearly natural as possible.

The Puritans are represented as just coming out of their log cabin to attend church. In the background are Indians who have been making a target of the cabin and their hostile arrows will be noted on either side of the doorway. A turkey is tied to a block awaiting execution, while a squirrel is eating a nut on a not far distant stump entirely oblivious of danger. Quail and pumpkins are also in evidence.

This window is 18 ft. wide by 12 ft. deep. In the adjoining window was a display of Cutlery, Plated and Sterling Ware, with a few novelties.

C. S. LAWRENCE, 117 Chambers street, New York, has commenced business as manufacturers' agent representing out of town manufacturers in New York City, nearby territory and the Philadelphia market. He will handle Hardware and kindred lines. Mr. Lawrence was for many years with the Tower & Lyon Company, representative of the Union Hardware Company, Torrington, Conn., manufacturing well-known lines of staple Hardware and specialties, and is well acquainted with the trade in and around New York and in the Eastern States, having traveled extensively in these sections. For years he had entire charge of the export trade of the Tower & Lyon Company and in that interval visited Great Britain, England and France. He is now the representative of some manufacturers and is in a position to take on others.

GEORGE H. SARGENT, president of Sargent & Co., sailed for Europe on November 10. He goes abroad on a business trip in which he will spend a portion of the time in Great Britain, but the larger part of it on the Continent. He expects to be gone at least two or three months, and is accompanied by Joseph H. Cherry, who takes with him a large and varied assortment of samples of the goods made by Sargent & Co. Mr. Cherry has for years been head of the export department and has made several trips to foreign countries in the interest of the house, including two tours around the world which required several years.

SUSPENDED at a point about on a line with the eye of lookers-in a card in one of the windows of the Hardware store of John E. Bassett & Co., on Chapel street, New Haven, Conn., last week, read as follows:

THANKSGIVING CUTLERY

If the folks are coming to dinner you ought to have enough good cutlery to go round.

HIGHEST QUALITY LOWEST PRICES

Below was a beautifully arranged display of Carvers at a wide range of prices. These occupied the floor of the window in front and at the side of the entrance to the store. On a platform raised about 8 in. above the floor was an assortment of Silverware of moderate and best quality. A shelf at the back exhibited Chafing Dishes, Percolators, &c. Bathroom fixtures covered the upper portion of the wall side of the window. The display seen at night in the brilliantly lighted window with the comparatively dark background of the closed store was especially effective and attracted much attention from passers-by.

Going After Christmas Trade.

Holiday Window with Prices on Each Article.

THE handsome holiday exhibit reproduced herewith occupied one of the windows of the store of John Halley Bradish, Batavia, N. Y., the week before Christmas last year.

The window is a corner one, both front and side lights being 7 ft. 6 in. by 10 ft. 6 in. in size. For the platform and framework old box covers were used. The pillars were pasteboard cylinders, which came inside rolls of linoleum. The four pedestals, or display stands, were each made of two circles sawed out of wood and nailed on a standard.

The framework and the floor of the window were covered with white canton flannel, while for the background white cheesecloth was used. All of the cloth was plentifully sprinkled with diamond powder to create a sparkling effect. Sprigs of green holly leaves and red berries decorated the window.

The display was naturally used in connection with

Christmas Window Display in the Store of John Halley Bradish, Batavia, N. Y. All the Articles Were Priced and Many Sales Were Effected.

newspaper advertising, and attracted a great deal of attention, it being regarded as the store's best salesman. The window was brilliantly lighted with electricty.

Each article had the price marked in plain figures on a dainty holiday card. As a result many persons stepped inside the store and said they would take the Carving Set, Chafing Dish or set of Spoons in the window marked so and so. The window influenced sales without any haggling over price, and all the salesmen had to do was to wrap up the goods and take the money.

Small Christmas Checks as a Means of Advertising.

TWO retail houses, one in the State of New York and the other in Pennsylvania, hit upon a cheap plan for increasing their business and pleasing their patrons about Christmas time last year by sending out checks for small amounts. While the object aimed at in both instances was the same, the carrying out of the plans differed.

A Mimeograph Letter.

The Stewart & Bergen Company, Fort Plain, N. Y., selected from its ledger the names of a few hundred of its best customers. Having arranged with the bank for checks of different color from those regularly used, the company deposited just the amount of currency necessary to pay for every five-cent check thus sent out, so that the checks would not have to go through the regular business course. The checks were signed with a rubber stamp. The following mimeograph letter and a personal check, like the one reproduced herewith, were sent to each of the selected names:

Dear Friend:

We just want to take five cents' worth of your time to read this letter and inclose check in payment of the same, so that you are nothing out if you do not buy of us, and you certainly will be well paid if you do buy.

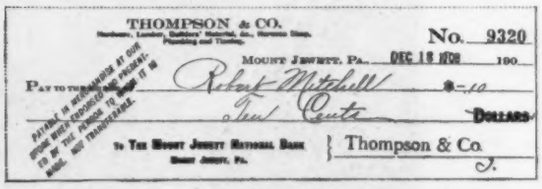
This is the time of the year to make people happy, and you will be happier if you make some one else happy. We have many things which will give pleasure to those who receive them if you select the present that is suited to the wants of the one to whom you give. Without knowing the wants of the person, we would suggest the following in general:

GIRLS like Skates, Chafing Dishes, a small Watch, Penknife, Scissors, Toy Wringers, Sleds, Wagons, Velocipedes, Automobiles.

LADIES appreciate Bread Mixers, a nice new Range, Carving Knife and Fork, a Carriage Foot Heater, Carpet Sweeper, Crumb Tray and Brush, Food Chopper, a set of Nickeled Sad Irons, Nickeled Tea or

FORT PLAIN, N.Y. DEC 16 1908 No. 12133
05 FARMERS & MECHANICS BANK
Frank Coze $5 00
five cents
STEWART & BERGEN CO.
DEC 16 1908 Per A Stewart Pres.

Stewart & Bergen's Holiday Check for Its Customers.


THOMPSON & CO.
No. 9320
MOUNT JOY, PA. DEC 18 1908 100
PAY TO THE ORDER OF Robert Mitchell $5.10
Five Cents DOLLARS
PAYABLE IN MERCHANDISE AT OUR STORE WHEN PRESENTED BY THE PERSON TO WHOM IT IS MADE, AND NOT TRANSFERABLE.
To THE MOUNT JOY NATIONAL BANK Mount Joy, Pa.
Thompson & Co.

Thompson & Co.'s Holiday Check for the Children.

Coffee Pot, Tea Kettle, Baking Dishes, Roasting Pans, set of Knives and Forks or Spoons, a piece of Enameled Ware, Electric and Gas Reading Lamps, and many other useful presents which we have.

BOYS like Sleds, Fish Poles, Wagons, Hockey Sticks, Automobiles, Watches, Tool Chests, Skates, Jackknives, Air Guns, Pocket Flashlights, Electric Motors, Electric Toys, Electric Trolley Cars and Track, Boys' Axe, Rifles, Tools.

MEN like a Razor, set of Tools or a single Tool, a Jackknife, Razor Strop, Cup and Brush, a Shotgun, Rifle, Revolver, Horse Blanket, Lantern, Horse Clippers, set of Bells, set of Harness, Electric Pocket Lamp, Ice Creepers, Ingersoll Watch, Match Box, Dog Collar, Oil Stone or Hone, Grain Measure (sometimes ladies give a Lawn Mower, but some men do not like them very much), Fur Robes, Thermometer, Horse Whip, Dog Whip, Measuring Tape, Pocket Rules.

We have many other useful presents which will give pleasure for a long time. Come in and look around whether you buy or not. We thank you for the trade given us in the past and trust the coming year will have many good things in store for you. We wish you a MERRY CHRISTMAS and A HAPPY NEW YEAR.

Some Results.

The results warranted the effort, customers were pleased and business was materially increased on the articles mentioned in the letter. One recipient of a check was a farmer who traded the amount out in the store. Another man gave his check to his son, but talked about it to almost every one he met. The company received an order from him for a furnace. A third party was pleased at being remembered, and the company did a job of plumbing for him.

An unlooked for result was that a number of cus-

tomers who received the checks came in and paid their accounts, thinking it a good joke or a gentle hint that they should settle up. Most of the checks were cashed at the bank, while a few were taken to the store and traded in goods. The checks were indorsed before they were honored.

The Pennsylvania Plan.

Thompson & Co., Mount Jewett, Pa., interested parents by sending 10-cent checks to more than 600 school children in the town, being very careful that every scholar got one. All the checks were made payable in merchandise at the store, a rubber stamp being used to make this announcement on the check. A rubber stamp was also used for signing the checks.

Appreciation Shown.

The checks were as carefully executed as though designed for $1000 instead of 10 cents. To see the children bring the checks and select their present, the firm writes, one could not help thinking that they regarded them as of great value. Some bought articles worth 15, 25 and 50 cents and even more, paying the extra amount in cash. Most of the children, however, took just the 10 cents worth.

It was considered, by the firm, the cheapest advertising that it had ever done, and it expects to extend the scheme to the county schools in the vicinity this Christmas.

Requests for Catalogues, Etc.

REQUESTS for catalogues, price-lists, quotations, &c., have been received from the following houses, with whom manufacturers may desire to communicate:

FROM WAKE & OSBORNE, who have succeeded Kennedy Bros., Genoa, Neb., handling Shelf and Heavy Hardware, Stoves, Tinware and Sporting Goods.

FROM A. L. RULE, who has bought the business of J F. Latimer, Red Oak, Iowa. He carries Shelf and Heavy Hardware, Stoves, Tinware, Housefurnishings, Window Glass, Agricultural Implements, Paints, Oils, Sporting Goods and Automobiles.

FROM STAR GRAIN & LUMBER COMPANY, which has purchased the business of H. T. Crawford, Hall's Summit, Kan., handling Hardware, Grain and Lumber.

FROM DURHAM HARDWARE COMPANY, which has succeeded to the business of M. Durham, Coopersville, Mich., carrying Shelf and Heavy Hardware, Stoves, Tinware, Window Glass, Paints, Oils, Sporting Goods and Cream Separators.

FROM CHAS. K. WHITE HARDWARE COMPANY, which has been incorporated with a capital stock of $10,000 in Richmond, Va., doing a wholesale and retail business in Shelf and Heavy Hardware, Stoves, Tinware, Housefurnishings, Window Glass, Paints and Oils.

FROM J. H. WRIGHT, who has purchased the business of C. Bahl, Howe, Neb., handling Shelf and Heavy Hardware, Stoves, Tinware and Housefurnishings.

FROM J. H. WAGNER, who has purchased the business of E. J. Davis, Shinglehouse, Pa., carrying a complete line of Hardware, Pipe Fittings, Plumbers' Supplies and Agricultural Implements.

FROM BROWN HARDWARE COMPANY, Salem, Va., which has been incorporated with a capital stock of $50,000, and will handle at wholesale and retail Shelf and Heavy Hardware, Stoves, Tinware, Window Glass, Agricultural Implements, Paints, Oils and Sporting Goods.

FROM DIXON-WITHERSPOON COMPANY, 21 South Tryon street, Charlotte, N. C., which has opened up in business, carrying a stock, including fine China, Crockery, Glassware, House Furnishings, Enameled Ware, Tinware and Wooden and Willow Ware. The company will be incorporated with a capital of $25,000.

FROM LEACH & BIEDINGER, who have purchased the business of G. N. Smith, Creston, Neb., and will handle Shelf and Heavy Hardware, Stoves, Tinware, House Furnishings, Agricultural Implements, Window Glass, Paints, Oils and Sporting Goods.

Probing the Express Companies.

THE Public Service Commission held a hearing November 8, as announced, on the complaint of the Merchants' Association of New York, at the headquarters of the association, 54 Lafayette street. The session lasted the entire day and brought out much pertinent sworn testimony from highly responsible sources.

Former Attorney-General John W. Griggs and S. W. Plitt represented the association; T. B. Harrison appeared for the Adams, American and Canadian Express companies, and H. S. Marx for Wells-Fargo & Co. Frederick W. Beecroft, general manager of the Century Company, was an important witness, as his house is a large shipper of books. One of many grievances recited concerned a case of books valued at $70 which was undelivered to the consignee and required a year to get back to point of shipment. In his opinion many of the express company employees were incompetent and careless. Another was a prepaid shipment to Missouri in 1907 amounting to $1.15 in charges, upon which the recipient paid an additional charge of $1.15, and for which neither recipient or shipper had ever been able to collect the excess and unwarranted charge.

The matters considered were roundabout routing, delays in delivery, non-delivery, failure to notify consignors of non-delivery, delay in settling claims and failure to account for C.O.D. collections.

The question of rates was not taken up, the commission disclaiming jurisdiction in that particular except on formal complaints relating to specific routes. The commission took the matter under advisement and privately indicated it was probable the investigation prayed for would be undertaken.

Hendricks' Commercial Register

THE eighteenth annual (1909) edition of Hendricks' "Commercial Register of the United States," for buyers and sellers, has lately been issued. There are over 1300 pages, 10 x 7½ in., containing, it is said, about 350,000 names and addresses, grouped under more than 35,000 classifications. The comprehensiveness of the work may be inferred from the total of 87 pages of index of four columns each. The classifications represent exhaustive lines of machines, material, apparatus and specialties required in the architectural, engineering, mechanical, electrical, manufacturing, railroad, mine, quarrying and various other industries. It is published by the Samuel E. Hendricks Company, 74 Lafayette street, New York.

Balata Belting.

R. & J. DICK, LTD., Glasgow, Scotland, manufacturers of Dick's Original Balata Belting, have begun the erection of a good sized factory at Passaic, N. J., for the production of this kind of Belting in the United States. The works, it is expected, will be in operation about January 15 to February 1. The business was established in Glasgow 35 years ago, and the firm has about 20 branch houses in leading cities in Europe, Mexico, Central and South America, Australia and in the Orient, including China, India, Japan and the Straits Settlements. Their office in New York is in the Hudson-Terminal Building, 50 Church street.

The Annual Report of the Post Office Auditor.

An Interesting and Significant Document.

FROM OUR SPECIAL CORRESPONDENT.

WASHINGTON, D. C., November 9, 1909.

THE annual report of Auditor M. O. Chance of the Post Office Department, which has just been made public here, contains much information of interest to merchants of the country, and is characterized by statements that will be regarded as highly significant in view of the fact that the document doubtless received the formal approval of the Postmaster-General before it was published. In a carefully prepared summary the following declaration is made regarding the functions of the postal service as they are understood by the Auditor and, presumably, by his superior officers in the department:

Postal Service a Business Institution.

> Strictly speaking the postal service is not a governmental function. It is a business institution, conducted under public auspices, authorized to designate the routes over which the mail shall be carried and the offices at which letters and other documents shall be received to be distributed or forwarded; to superintend the carriage of the mails; to maintain money order and registry systems, and to take all measures necessary to carry out the purposes for which it was organized. The Post Office Department has both earnings or receipts and expenditures or disbursements; in some respects it competes with private financial interests, and in this way differs from other executive departments.

The Auditor presents no suggestions for enlarging those functions of the postal service in which it "competes with private financial interests," and it may be assumed that he has left to the Postmaster-General and his immediate assistants the duty of outlining all recommendations in this regard in their forthcoming annual reports. The Postmaster-General cannot in fairness be said to be committed to the policy of his predecessor concerning the desirability of a general parcel post and so-called package service on rural routes, but as First Assistant Postmaster-General he has advocated post check currency projects, and his annual report will, therefore, be awaited with very lively interest.

Postal Deficit for Last Fiscal Year Reduced to $17,479,770.

The auditor's report reduces somewhat the original official estimate of the postal deficit for the fiscal year ended June 30, 1909. The revenues for the year are now found to have aggregated $203,562,383, while the expenditures totaled $221,042,153, from which it appears that the net deficit was $17,479,770, or an increase of $569,491 over the shortage for the fiscal year 1908.

Unusual Expansion of Money Order Service.

During the year no less than 6700 additional post offices were authorized to issue money orders and, as heretofore stated in this correspondence, this unusual expansion of the money order service is understood to have been directed by the former Postmaster-General in expectation of the passage by Congress of a postal savings bank bill.

While the auditor states that the increase in the number of money orders offices "appears to meet with public favor," it is reported on excellent authority that the present Postmaster-General intends to make a heavy reduction in this branch of the service in the interest of economy. It is believed that a very large sum can be saved without abolishing a single money order office for which there is a real necessity.

Annual Income and Deficit for Nine Years.

An interesting statement is submitted by the auditor, showing the annual income and the deficit for the last nine fiscal years as follows:

Fiscal year.	Revenues.	Deficit.
1901	$111,631,193	$3,981,520
1902	121,848,047	2,961,169
1903	134,224,443	4,586,977
1904	143,582,624	8,812,769
1905	152,826,585	14,594,387
1906	167,932,782	10,542,941
1907	183,585,005	6,692,031
1908	191,478,663	16,910,278
1909	203,562,383	17,479,770

Rural Free Delivery an Expensive Item.

The auditor also presents some comparative figures showing the relative growth of the rural free delivery, the city delivery service and the railway mail service. The railway mail service, one of the most important branches of the Department, cost in 1900 $8,829,767 and in 1909 the expenditures on this account rose to $18,356,800.

The city delivery service, which was developed to large proportions long before rural free delivery was thought of, cost in 1900 $14,671,362, and in 1909 the total was $29,770,650.

Rural free delivery, which was inaugurated a little more than a decade ago, cost in 1900 only $420,499, but in 1909 the disbursements on this account reached the tremendous total of $35,549,260. Only one other item in the postal account—namely, the general transportation of the mails, exceeded the cost of the rural free delivery service in 1909.

Future Expansion of the Service.

There is reason to believe that the present Postmaster-General will make a strong effort to prevent the expansion of the rural free delivery service in the future beyond a reasonable rate of growth and, wherever possible, will discontinue unnecessary routes. Nevertheless, the appropriation for the current fiscal year materially exceeds the expenditures for the last fiscal year, and it is understood that the estimate for next year's disbursements will be still larger.

It also remains to be seen whether Congress will pass any of the pending bills increasing rural carriers' salaries, granting them extended leaves of absence with pay and providing for their complete equipment at government expense. Should any of these measures be enacted many millions will be added to the cost of the rural service and, therefore, to the annual deficit.

Postal Currency Project.

The Auditor does not hesitate to criticise some of the chief features of the bill now pending in both Houses, providing for the codification, revision and amendment of the postal laws, which carries with it a comprehensive postal currency scheme, although Mr. Chance does not discuss that particular feature of the measure. His criticisms are directed against the division of authority between the Post Office and Treasury departments over the accounting branch of the postal service, which he regards as unwise.

The frankness with which these criticisms are presented lends additional color to the report current here that the Postmaster-General will withhold his support from the pending measures, if, indeed, he does not openly oppose them. It should not be understood, however, that Mr. Hitchcock is against the proposed postal currency, as he is officially on record in favor of a similar project. It is probable that if the measures codifying the postal laws are abandoned it will not be practicable to secure the passage of an independent bill authorizing a postal currency in addition to the very efficient money order system now in force.

THE STAR EXPANSION BOLT COMPANY, with general offices at 147 Cedar street, New York, manufacturer of the Star Expansion Bolts, has moved its New Orleans, La., sales office to 504 Audubon Building. The office is in charge of D. S. Miller.

Hardware Association News.

At a recent meeting of the Executive Committee of the North Dakota Retail Hardware Association, C. N. Barnes, secretary, Grand Forks, it was decided to hold the 1910 convention on Tuesday, Wednesday and Thursday, January 25, 26 and 27. It has also been determined to provide quarters for a Hardware exhibition, and every effort will be made to make this a prominent feature of the gathering. A plan of the exhibit hall will soon be ready for distribution, with scale of prices charged for representation. As a number of requests for space have already been received from manufacturers, it is expected that the exhibitors will be quite numerous. The convention, as already noted in these columns, will be held in Grand Forks.

The Arkansas Retail Hardware Association, W. L. Harlan, secretary, Little Rock, has decided to give another grip this year to the associate member (traveling man) who secures the largest number of new members prior to the annual meeting in June, 1910. A small number of the regular members have not yet paid their dues for the year, and with a view to retaining as many of these members as possible a suit case is also being offered to the traveling man who succeeds in collecting the largest number of these backward accounts. This list of members in arrears will not be prepared until November 15, and any remittances received prior to that date will of course remove the name of the delinquent member from the list. The contests will close at noon on Saturday preceding the opening of the 1910 convention.

The Executive Committee of the Wisconsin Retail Hardware Association held a meeting in Berlin on the 2d inst., for the purpose of making final arrangements for the Hardware exhibition which is to be held in conjunction with the annual meeting in February next at Milwaukee. By a unanimous vote it was decided to ask all exhibitors to display a sign, which the association will furnish free of cost, in connection with their displays, reading, "We do not sell to catalogue or premium houses." C. A. Peck, Berlin, secretary of the association, in his November bulletin takes occasion to urge the members to come to the convention ready to place as many orders with the exhibitors as possible.

The directors of the Hardware Dealers' Mutual Fire Insurance Company of Wisconsin met at their office in Berlin on the 2d inst., and decided to continue the dividend on 1909 business at 50 per cent., the same as for the previous year. They also appointed a committee consisting of F. J. McPherson, Oshkosh, P. J. Jacobs, Stevens Point, and J. B. Barlow, Ripon, as an Auditing Committee to examine the books of the company and report at a meeting to be held in Berlin December 28.

The eighth annual convention of the New York State Retail Hardware Association will be held in Rochester March 1, 2, 3 and 4, 1910. The sessions will be held in the ballroom of the Hotel Seneca, as was the case last year. The Hardware exhibition will be held in the exposition hall, which is a new building put up as an annex to the Convention Hall during the past summer. It has just been completed and was used for the industrial exposition held in Rochester October 12 to 23. This building has a capacity about three times the size of Convention Hall, and accordingly the exposition managers will be able to provide accommodations for a larger number of exhibitors than ever before. Diagrams of spaces will be sent to manufacturers generally during the next few days. The managers in charge of the exposition are Louis J. Ernst, Rochester, and John Holley Bradish, Batavia. Mr. Ernst will have charge of the sale of spaces and all communications in regard to spaces should be addressed to him.

The C. B. Sutton Hardware Company, Little Rock, Ark., has been succeeded by Casey & Paschal, who will carry a full line of Hardware.

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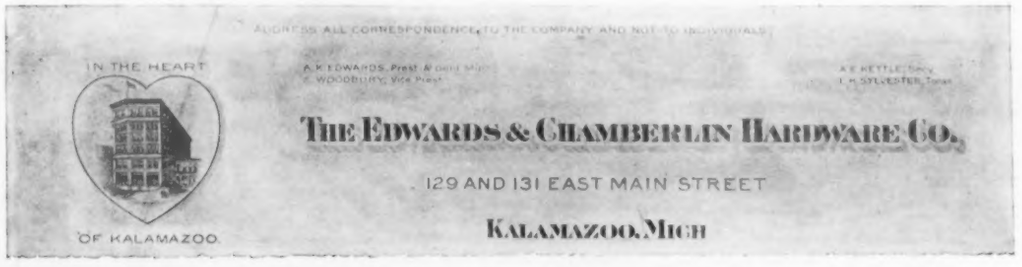
Hardware Merchants' Letterheads.

IN the way of suggestion to our readers we reproduce herewith some letterheads of retail Hardware merchants. Most merchants apparently give but little attention to the make-up and arrangement of their letterheads, contenting themselves with giving the name and address and a more or less perfunctory reference to the business. A few seem to recognize the opportunity thus afforded to advertise the store in some unique, unconventional or characteristic way. Accordingly the letterheads below are given a place not because of their artistic excellence but on account of the presence of some novelty in their composition.

JNO. E. SOMMERS, Pres.
NO GOODS RECEIVED UNLESS ACCOMPANIED BY B/L WITH RATE AND WEIGHT INSERTED
TELEPHONE 265
Sommers Hardware Company
INCORPORATED
Hardware & Harness.
AGRICULTURAL IMPLEMENTS, PIPE, PIPE FITTINGS.
SADDLERY, BELTING, MILL SUPPLIES.
Clarksdale, Miss.

The Special Brand of the House is Given Prominence. There is Also a Reminder that Careful Attention is Given to the Matter of Freights and Shippers are Expected to Co-operate.

No Frills, But Straightforward and True.



The Location of the House in the Business Center of the City is Emphasized.

Quality a Prime Consideration.

Every man is furnished, if he will heed it. with wisdom to steer his own boat.—*Emerson.*

Vanity and Failure.

IT seems to me that vanity is one of the greatest causes of failure we have. I have known of men who were enjoying a business which enabled them to find happiness in life. They were rendering the world a service and were well paid for that service. Had they been content to let their business grow in a natural manner they would have eventually built up a business based on a solid foundation.

But they wouldn't wait. They saw a competitor erect a great structure and hire a few score more helpers. Instantly their vanity was touched. They didn't want their competitor to have a finer building than they.

So they borrowed money. They, too, erected big plants. Then they stayed awake nights worrying over their debts. Their business did not grow fast enough to take care of the output, or else their worrying over their debts took so much of their strength and energy that they didn't have any left for constructive business building.

Once a man of my acquaintance spent several months of his time traveling around trying to borrow money with which to pay his debts and get a fresh start. He failed to get the money and lost his business. Had he devoted the same strength and eneregy to building business conservatively instead of trying to do a million dollar stunt with a thousand dollar equipment he would have succeeded in a big way.

I have a lot of foolish notions. One of them is that it is better to have a thousand customers upon every one of whom a profit is made than to have one hundred thousand that tax a business beyond its natural strength and prove to be nothing more than makers of expense.

Some men like to be called optimists. An optimist is a man who finds a raffle ticket which entitled him to a chance on an automobile and who on the strength of that straightaway commences to build a garage.

More than one business man of my acquaintance is of that type. To paraphrase Riley: Failure will get them ef they don't watch out.—*Thomas Dreier.*

Thought More Powerful Than Circumstance.

It is the condition of the mind rather than circumstance that determines what the future of an individual shall be. That environment and influence are of greatest importance is not to be questioned, but human thought is more powerful. If it were true that circumstance alone shapes our careers, we should have had no Shakespeare, no Lincoln, no Edison. The old theory has been shattered since the dawn of time—the boy who is reared in poverty, without opportunity, without educational advantages, is not barred from becoming wealthy, successful, great.

If one in discouraging surroundings says repeatedly to himself, "I am without opportunity; I have no chance to learn, no friends to help me, no time for study, no way out of my poverty," he is likely to remain in his present place and curse "luck" for keeping him there. Should this boy, however, throw back his head, and say firmly to himself: "I can learn; I will take time for study; I shall make stepping stones of my hardships and do my best to live higher and work better, and some day the opportunity will come," time and patience will see him in the better place.

I Can
I Will
I Shall

It is the way the individual permits it to affect his thoughts that determines whether a circumstance or influence is constructive or destructive. Hardships are really a blessing if rightly treated. Failures help us on to success because they furnish the needed lessons. The life of ease and luxury is productive only of weaklings. Financial losses and hardships should be an inspiration to greater and renewed effort. We find this point repeatedly illustrated in actual life. The same condition plants in the mind of one sufferer worry, discouragement, pain, while another takes it as "the way of the world," and, with new courage and greater ambition, makes a blessing of his hardship. Ordinarily, we find in life what we seek—ugliness, trouble and gloom await the "grumbler" where there is beauty and harmony and happiness for the optimist. Poverty and degradation may either stimulate an ambition to climb out of their grasp or drag their victim deeper into the net—in whichever way they are permitted to affect his mind.

Hardships and Failures Should Be an Inspiration

"**Worry Kills**"—that is the motto that I would put on the wall of every office, every factory, every home in this land. And would you believe it—there are hosts of people who cannot find trouble enough in the future, but spend their time grieving over errors of the past. The present is all that concerns us. The very act of worry breaks down the human system, and makes it less powerful to resist "the slings and arrows of outrageous fortune." To worry over future trouble is to invite its coming.—*Henry Herbert Huff.*

Worry

Reflections.

Many are called, but most of them turn over and go to sleep again.

The most dangerous ailment known to mankind is the swelled head.

The fellow who thinks that his job is unimportant usually gets just that kind.

The fellow who belittles the successes of others will never have any of his own.

Necessity is the mother of invention; that is what makes beggars' pleas so ingenious.

Man's greatest enemy is his fear of himself.

Heredity may cover the facts in the case, but no gentleman ever invokes it as an excuse.—*The Silent Partner.*

Business Builders.

We are punished by the wrong we do—not for it.

When a man talks to you about "bad luck" he really means "bad management."

You cannot be a good business man unless you have learned to be a good citizen.

Success is a state of mind—it lies within, not without.

Only those people who start something can fail. The failure then has some satisfaction in knowing he tried—and trying is no disgrace, even though the attempt be a failure.

The world cares little for what you believe—it's what you do that counts.

When in doubt—use Old Fashioned Common Sense.—*Glenwood S. Buck.*

Industrial Parade Float and Model Hardware Store.

Norvell-Shapleigh Hardware Company's Part in the St. Louis Centennial.

THE Norvell-Shapleigh Hardware Company, St. Louis, Mo., was represented by the float reproduced herewithin in the industrial parade which was one of the principal features of the centennial anniversary week recently celebrated in that city. The men on the float were dressed to suggest different branches of the company's business and included a mechanic, a blacksmith, a hunter, a fisherman, baseball and football players, a carpenter, &c.

A huge handled Axe extended nearly the entire length of the float, one end being supported on the Diamond Edge sign, which rested on a carpenter's bench. The sides of the float were elaborately decorated and sampled with Tools. A Gimlet 8 ft. in hight was given a place on each side of the end of the float, with lettering on the handle reminding the public to "Read the Gimlet," which is the house organ of the company.

A Model Hardware Store.

The company also fitted up a model Hardware store, which was of special interest to visitors during the celebration, as it was designed to show how inviting and attractive a Hardware store can be made to look. Competent clerks were in charge to talk up the store and goods. In Fig. 2 is a partial view of the store from the entrance showing a board artistically arranged with various specialties of the company's Diamond Edge line, as well as end of the shelving with which the store was equipped. The board was also a reminder of the company's birth, the business having been established in 1843. This side of the store was devoted to small Tools and Enameled Ware. On the other side the drawers were sampled with Hatchets, Hammers, Axes and various other items. In the rear of the store were Hand Saw samples, with open bins at the top containing original packages of Saws.

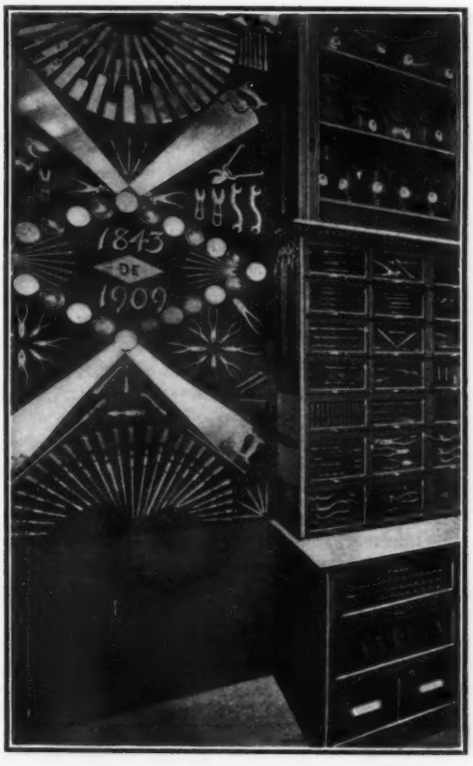


Fig. 2.—Partial Interior View of the Model Hardware Store from the Entrance, with Sample Board of Tools, Warren Shelving Sampled with Tools, and Enameled Ware on Open Shelves Above.

The model store window had small Tools lying on the floor; otherwise the window was free from goods, giving an unobstructed view of the entire interior of the store. The glass panel of the entrance door was covered with Razors, Pocket Cutlery, Scissors and Shears.

Fig. 1.—Norvell-Shapleigh Hardware Company's Industrial Parade Float, Handsomely Decorated and Sampled with Tools. Each Man Suggests a Different Branch of the Company's Business.

Cost Accounting in the Implement and Vehicle Trade

The Conference at Chicago.

THE National Federation of Retail Implement and Vehicle Dealers' Associations and the Special Committee on Organization, appointed some months since for the purpose of inquiring into the betterment of conditions existing in the retail Implement and Vehicle business, recently held a conference in Chicago. This committee consisted of the presidents and secretaries of the following associations: National Wagon Manufacturers' Association, Carriage Manufacturers' Association of America, Carriage Builders' National Association, National Plow Association, National Association of Agricultural Implement and Vehicle Manufacturers, National Federation of Retail Implement and Vehicle Dealers' Associations, as well as two delegates from each of the Implement and Vehicle clubs of Kansas City, St. Louis, Minneapolis, Dallas, Omaha, Oklahoma City, Des Moines and Peoria, E. W. McCullough, secretary of the National Wagon Manufacturers' Association, Chicago, being chairman.

Percentage of Expense.

The first step in the work of the committee was to send out a letter to the president or secretary of each Implement dealers' association throughout the country explaining the effort being made, and requesting him to send out to those members of his organization which he considered the best equipped to answer question blanks furnished for the gathering of information concerning the cost of doing a retail business. This blank was reproduced in our columns at the time.

The following table shows the percentage of cost of doing business in various States, taken from the dealers' reports received as gave evidence of being most carefully compiled:

Colorado	17 %	*Oklahoma*	19 %
Idaho	20 %	*Oregon*	17 %
Illinois	14 %	*Ohio*	22 %
Illinois, South	15 %	*Southwestern Kansas and Oklahoma*	17 %
Indiana	19 %	*South Dakota*	15 %
Iowa	21 %	*Texas*	14 %
Kansas	20 %	*Washington*	17 %
Michigan	19 %	*Wisconsin*	19 %
Minnesota	17 %		
North Dakota	17 %		

In Summing Up Results,

after carefully going over the blanks returned and after much correspondence with retail dealers, the committee reached the following conclusions as to some of the conditions vitally affecting the work:

1. The great lack of systematic record keeping to enable the business man of to-day to know exactly where he is at at all times, and to know whether he is gaining or losing before the annual inventory is taken.

2. No attempt in many cases to keep expense items separate from other expenditures, so that the increase or decrease of expenses can be watched.

3. General failure to include in the costs of doing business such important items as:

INTEREST on capital employed.

SALARY for proprietor, partners or members of their families employed in the business.

RENT for buildings owned by the firm and used by them.

DEPRECIATION—Reduced value of carried-over stock, wear and tear on tools or equipment, buildings, &c.

4. The fixing of selling prices by an estimated per cent. supposed to cover cost and profit without proving such percentage by actual cost figures.

5. The error in figuring costs and profits by per cent. on invoice instead of selling price.

Permanent Organization Advocated.

Feeling that this lack of cost knowledge is the prime factor in nearly all business troubles, the committee recommended the forming of a permanent organization that will have for its principal object the systematic education of the retail trade along cost and accounting lines.

This plan also contemplates the establishing of an office in charge of a competent person versed in accounting and familiar with the Implement, Vehicle and Hardware business, this office not only distributing plans and forms adapted to the several classes and business conditions but rendering personal assistance to those asking to be "started right."

For carrying out the project it is proposed to raise sufficient funds among those who would be directly or indirectly benefited to carry on the work for at least one or two years. At the expiration of this time a fee system could be established to make it self-supporting, as well as deriving revenue from the sale of books and blanks. The committee also suggested that the work be conducted under the direction of the secretary of the National Federation.

Position of the National Federation.

The report of the organization committee was referred to a special committee by the Federation, whose report, which was approved by that body, was in part as follows:

> We concede not only the wisdom but necessity of arriving at the correct cost of the goods the dealer handles in order that he may sell them at a figure that shall represent neither too great nor too small a margin of profit, and to this end believe such information would materially assist him, prevent cutting of prices, the demoralization of trade, and in many instances save him from failure. We believe the Federation should do all it consistently can to assist in accomplishing such a result.
>
> The recommendations of the chairman of such joint committee as embodied in the report submitted are in substance as follows:
>
> That a campaign of education should be carried on among the dealers in order to impress upon them the great necessity of determining just what items enter into the cost of their goods;
>
> That this bureau of information should be run in connection with, under the jurisdiction of, and at the expense of the Federation, the jobbers and manufacturers assisting if necessary;
>
> That in order to carry on this work successfully an expert accountant and one experienced in the Implement and Vehicle business should be engaged, whose work should be the sending out of letters, pamphlets, diagrams of accounts, &c., these to illustrate the subject, and to make personal visits for the purpose of showing dealers how to install a proper system of figuring costs and keeping accounts.

Organized Dealers Are a Small Minority.

> Your committee finds that the dealers' associations now represent such a small proportion of the entire number of dealers in the respective States that we feel to carry on such a campaign as suggested would be doing so at the expense of the minority for the benefit of the great majority, and with which majority as yet we have no direct connection or relation giving us influence therewith;
>
> That in the carrying on of the work of the several State associations and this Federation in order that we may establish such relations as will bring other dealers within the range of our influence for consultation, advice and education we are spending thousands of dollars annually besides valuable time of our members without pay;
>
> And while we feel that indirectly we may receive material benefit as a result of such work, we believe the manufacturers and jobbers realize that in the changed conditions created thereby they, the manufacturers and jobbers, are receiving fully as much and even greater benefit and at practically no expense to them.

Federation Has No Funds for Work.

We find further that the salary of an expert accountant as suggested and the expenses incident to the carrying on of the work outlined would entail an expense for which the Federation has no funds, and that it would be impractical to ask the members of the constituent associations to stand such who have already at great expense produced those bettered conditions in which all dealers, including those whom we desire to educate, have shared alike without in the majority of cases having contributed anything.

For instance, it is claimed that in certain States the membership of the association does not at the present time represent to exceed 25 per cent. of the dealers in that State, and for us to assess that 25 per cent., the necessary expense, to educate the 75 per cent. it appears would not be just, and again the 75 per cent. are the ones in whom the jobbers and manufacturers are more deeply interested than are the members of the association in such State, and these jobbers and manufacturers have continuous and direct connection with this 75 per cent. through their business relations, while the members of the association in such State have not.

We believe, therefore, that the manufacturers and jobbers who are directly interested in the bettered conditions which should come to this great majority through the operation of this proposed bureau should prosecute this work themselves with what assistance this Federation and the constituent associations can reasonably give.

Willingness to Co-operate.

In view of the conditions herein recited your committee cannot consistently recommend the adoption of the report of the joint committee. We do, however, believe this Federation should recognize the efforts that are being put forth by the jobbers and the manufacturers to bring about better conditions among the dealers, and, therefore, that this Federation and the constituent associations should supplement the work of the manufacturers and jobbers with whom we desire to fully co-operate, and who are ever assisting us along other lines as much as we possibly can.

We, therefore, suggest that the sheet of questions and suggestions prepared by the joint committee chairman be printed at the expense of the Federation and furnished to the secretary of each constituent association in such numbers as he may desire for distribution to the members of such associations at the time of their annual meetings, and to such other members by mail as may not have been in attendance at such meeting, and that this question be given prominence in the report of the secretary of this Federation to the several State associations, and that they be asked to give this subject special consideration at such annual conventions; and we recommend to the officers of each constituent association that they invite some member of the manufacturers' or jobbers' association to address their associations at their annual meetings upon this question.

The subject will come up again at a meeting to be held in Kansas City, January 11, when it is hoped to bring the plans to a final conclusion and place the work on a permanent basis.

THE PACIFIC HARDWARE & STEEL COMPANY, San Francisco, Cal., has decided to open a branch house in Los Angeles. A large structure is now in course of erection, which will be occupied by the company on completion. It will cost about $100,000. The building will extend from Third to Second streets, a length of 362 ft., occupying a frontage of 80 ft. on each of these thoroughfares. It will be of mill construction with brick exterior. For a depth of 200 ft. back to Third street it will be four stories in hight. The remainder of the structure will be a single story, 30 ft. high, this part of the building being used as an iron warehouse.

Stevens' Visible Loading Repeating Rifle, No. 70.

The J. Stevens Arms & Tool Company, Chicopee Falls, Mass., is now manufacturing its visible loading repeating rifle in two models, one for .22 short and the other for .22 long rifle cartridges. The barrel used for the .22 short cartridges is rifled with a slow twist, one turn in 25 in. The barrel used for .22 long rifle cartridges is rifled with a quicker twist, one turn in 16. in. The rifle made for .22 short will handle 15 cartridges and for the .22 long rifle, 12 cartridges.

Fleming Razor Stropper and Honer.

The Fleming Sales Company, 253 Broadway, New York, has improved both the construction and appearance of the Fleming razor stropper and honer put on the market last spring. The stropper has been reinforced at the shoulder where the tang enters the handle. The handles are of polished cocobola wood. The metal portions as now made are of a composition metal which contains a large percentage of nickel, hardened, tempered and highly polished and nickel plated. This serves to prevent rust, as formerly the metal portions were steel, nickeled. As manufactured at present the friction on the hone causes the metal bearing parts to wear bright and remain so. There is also an improved and patented holder to grip any safety razor blade, single or double edge, with or without holes. This razor will also both hone and strop any of the regular handled razors by slipping out the holder which grips the safety blades and inserting the large blade in the space usually occupied by the removable safety blade attachment.

Carborundum Valve-Grinding Compound.

A ready to use valve grinding compound is offered by the Carborundum Company, Niagara Falls, N. Y. This is a mixture of carborundum grains and powders with a high grade grease which is put up in a convenient little kit containing two collapsible tubes, one of the fine compound and the other the coarse, a package of carborundum cloth strips for cleaning the vibrator and contact points and a booklet of carborundum cloth for general use. For those who prefer to mix their own compound another little outfit is offered, containing two ¼ lb. of dry coarse and fine grains, also the cloth strips and booklet. The company explains that proper compression cannot be had with imperfect or pitted valves and that the powder will produce a perfect valve, giving a positively true contact seat, doing the work in but a fraction of the time required when ground glass, emery or other mediums are used. For the convenience of motor supply dealers, garage and repair station owners and machine shops, the compound is put up in 1, 3 and 5 lb. cans of the coarse and fine mixtures.

Detachable Wagon Runners.

The manner of converting the coaster wagon, made by the Wagner Mfg. Company, Cedar Falls, Iowa, into a

Fig. 1.—Detachable Runners for Converting the Wagner Wagons Into Sleds or Coasters Without Removing the Wheels.

sled without removing the wheels is shown in Fig. 2 of the accompanying illustrations. The device consists of

a patent detachable runner so formed as to slip on over the wheel, so that the wagon can be converted into a sled without removing the wheels. Being of steel the runner is made to hook on the rim with a spring effect which holds it securely in place. The runners can be

Fig. 2.—The Wagner Coaster Made by Removing the Box of the Wagner Wagon and Slipping Detachable Runners Over the Wheels.

easily and quickly slipped on and off, and the convenience of the arrangement is quite apparent. Detachable runners, No. 0, will fit all 11-in. flat tired wheels, No. 2 being adapted for use on rubber tired wheels. The weight of either style is 4 lb. per set.

The Dalton Cobblers' Outfit.

D. J. Dalton, 40 Dearborn street, Chicago, is offering to the trade the cobblers' outfit here illustrated. A distinctive claim made for this outfit is that it contains only first-class materials and warranted tools. The lasts and stands are made of malleable iron and are heavy, well shaped and full sized, the dimensions of the former being

The Dalton Cobblers' Outfit, Containing Only First-Class Materials and Warranted Tools.

indicated in the illustration. A knife and hammer, both of the best quality steel, are included in the kit, which also contains a patented peg awl fitted with a leather head. A supply of the necessary materials required for cobbling work comes packed with the tools in an antique oak hinged case of attractive appearance. The equipment is furnished in two styles, designated as No. 1 and No. 2, the first being identical with that shown and the other differing from it only in having lasts of larger size than those here represented. The sets are packed in cases of one-half dozen each, the shipping weight of which is 240 lb. per dozen.

The Siamese Twin Bolt.

The Diamond Expansion Bolt Company, 90 West street, New York, is offering the twin bolt shown herewith. The operation of attaching is illustrated in Fig. 1. A hole is punched in the metal, the nut removed, and the two sections spread. The upper portions of the bolt are then inserted in the hole, the lower sections drawn together and the nut turned up tight. A secure and

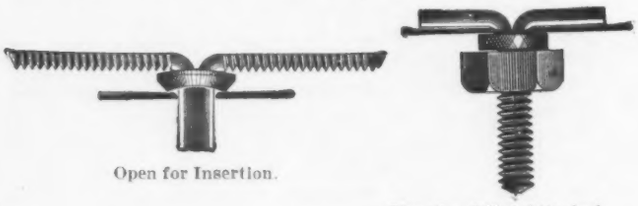


Fig. 1.—Siamese Twin Bolt for Securely Attaching Article to Hollow Metal.

positive hold is obtained without the necessity of tapping the hole, which is referred as difficult to accomplish in light sheet metal. In Fig. 2 is shown how a bracket may thus be attached to sheet metal. The scope of the device covers anything that can be bolted to any hollow metal which can be punched or drilled. It will bolt into hollow metal sash, door trims, window frames, skylights, sheet metal store fronts, metal ceilings and wainscoting; in fact, anything hollow of sheet metal where a common bolt cannot be used, because of the impossibility of securing the head, or where there is nothing to hold a wood screw. The bolt may be used to

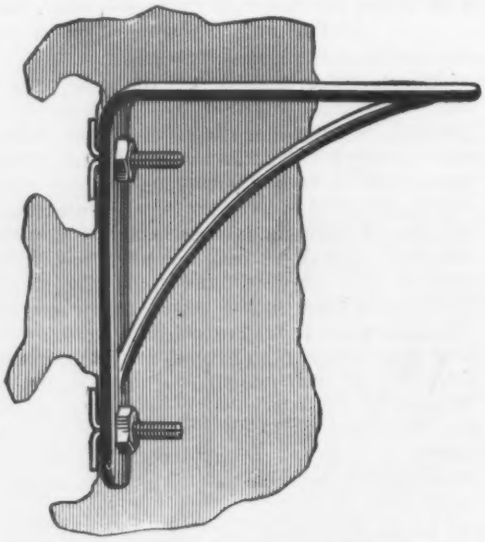
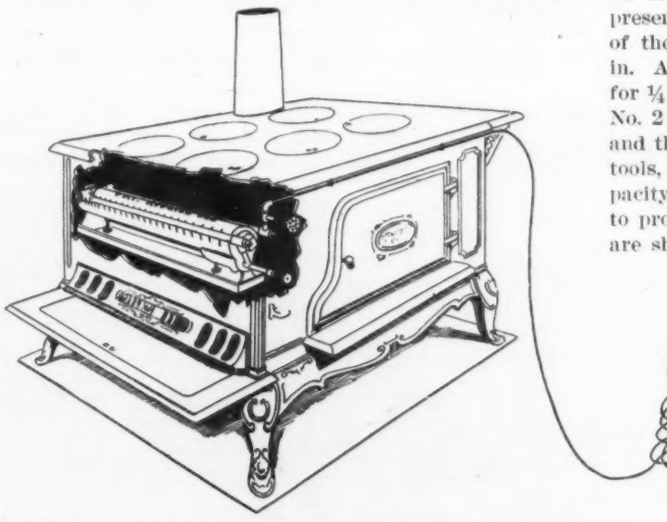


Fig. 2.—One Application of Siamese Twin Bolts Attaching Bracket to Sheet Metal.

fasten window shade and awning brackets, awning hoods, signs, ornaments, hooks, electrical devices, ventilators, insulators, &c. The company points out that the bolt will hold anything within its capacity absolutely sesure; that it cannot slip out of place or lose its grip by turning, and that it distributes the load over a large surface. Also that it is safe to apply on outdoor work because the rubber band, which serves as a hinge when inserting the bolt, is compressed when the nut is drawn up and completely fills the hole, making the opening weather tight. The bolts are made in the following sizes: 3-16 x ¾, 1 and 1¼ in.; ¼ x ¾, 1 and 1¼ in.

A Blue Flame Distillate Oil Burner and Generator.

George Drummond, 514 East Ninth street, Los Angeles, Cal., is offering the blue flame distillate oil burner, designed for use in an open fireplace, in cook stoves, heating stoves, boilers, furnaces, &c., as shown herewith. The burner has 46 outlets, 23 on each side, so that the

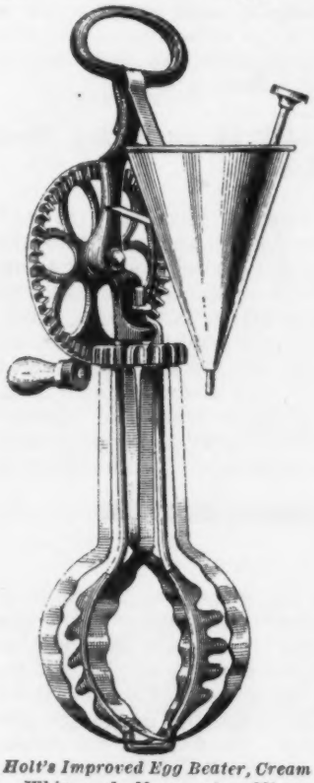


A Blue Flame Distillate Oil Burner and Generator for Use in Connection with Open Fireplaces, Cook and Heating Stoves, Boilers, Furnaces, &c.

heat may be equally distributed from one end of the generator to the other, and all the oil generated into gas before reaching the burner in order to be consumed without waste in smoke and soot. It is said to give a hot, clear flame, and to be safe, efficient and economical in operation. By using a long tube the tank may be placed outside of the house when desired, and either above or below the level of the burner.

Holt's Improved Dover Egg Beater, Cream Whip and Mayonnaise Mixer.

The Holt-Lyon Company, Tarrytown, N. Y., is offering an egg beater with the handle specially made for holding oil dripper, as represented herewith. It is pointed out that to make good mayonnaise dressing the oil must be applied very slowly at first. The oil dripper has a small tube soldered into the bottom of the funnel. A threaded sleeve is also soldered into the funnel, which receives a threaded bolt with tapered end passing through the sleeve. The bolt can be screwed down so as to control the flow of oil perfectly, which is first dropped and later increased to a small stream. The time required to beat the dressing is said to be 10 to 20 min., depending upon the quantity made and the strength of the operator. The drippers are not sold without the beaters, as all beaters for mayonnaise require specially made handles to hold the dripper attachment.



Holt's Improved Egg Beater, Cream Whip and Mayonnaise Mixer, with Oil Dripper Attached.

The Handy Die Stock.

The Handy Mfg. Company, Bridgeport, Conn., New York office, 73 West Broadway, is offering the die stock shown in the accompanying illustration. It is self-contained, there being one set of dies for all sizes in the stock. There are no loose parts or bushings, and it can be used to cut right as well as left hand threads. At present there are four sizes, although it is the intention of the company to add others with capacities up to 12 in. As they are now made the No. 1 tool has a capacity for ¼ to ¾ in., with special dies for ⅛ in. if desired; the No. 2 for ½ to 1¼ in., with ¼ and ⅜ in. dies if desired, and the No. 3 for 1 to 2 in. These three are single end tools, while the No. 33 is a double end tool, with a capacity for ½ to 2 in. pipe. The aim of the designer was to produce a compact and simple tool, and all the parts are shown in Fig. 2. There is no leader screw, and the

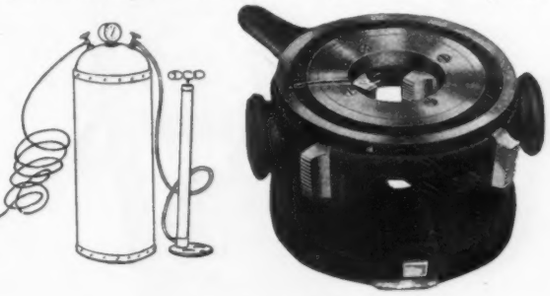


Fig. 1.—The Handy Die Stock, Having One Set of Dies for All Sizes of the Stock.

claim is made that the dies and guide will hold rigidly at any point without screws or nuts. It can be released instantly by the hand without a wrench, and in order that the threads may always be cleaned before the tool is removed from the pipe the construction is such that the tool must be given a full turn backward before it can be

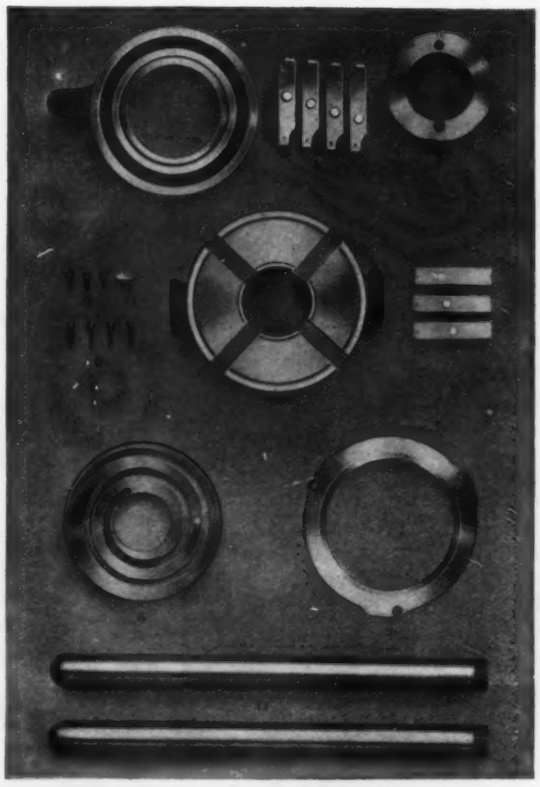


Fig. 2.—Parts of the Handy Die Stock.

released. The dies can be changed very readily without tools by simply turning the thumb lever around until the slot comes to the proper place when the dies each may be slipped out in turn. The framework of the tool is constructed so that the threads can be oiled with the die stock in any position. The cutting parts are said to

be made from high-grade crucible steel, and the dies are designed to give the greatest clearance with the maximum ease of cutting tight threads. The No. 33 tool weighs 16 lb. ready for use, and it will be noticed that the handles are removable, so it takes little room in the tool chest. The tools are guaranteed against defects in material and workmanship, and will be sent on trial.

Oil Barrel Truck.

The George P. Clark Company, Windsor Locks, Conn., has just put on the market the barrel truck shown in the accompanying illustrations, for carting barrels of oil and other liquids to places where they are to be transferred to tanks underground or floors. The truck was designed especially for use in an automobile garage, but it can

Fig. 1.—Oil Barrel Truck B4AHB10, for Carting Barrels of Oil and Other Liquids to Place Where Contents Are Put into Tanks Placed Under Ground or Floors.

obviously be used in other places where requirements are similar. The truck is fitted with two extra strong nose irons, which when placed under a barrel enable the user

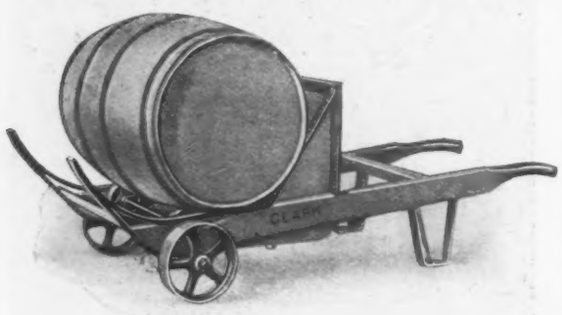


Fig. 2.—Oil Barrel Truck B4AHB10, with Barrel in Position.

easily to throw back the truck so that the barrel will lie in the position shown in Fig. 2. Toward the handle end of the truck there is a zinc tank having a small outlet, shown in Fig. 1, which is fitted with a very fine screen to serve as a strainer. When the barrel is on the truck the bung can be removed and the barrel easily turned on the four small rollers toward the handle end and the contents emptied into the zinc tank, thence passing through the small outlet into the tank below. The truck is thus of use in carting the barrel to the point where it is to be emptied, straining the contents and transferring the contents to the desired receptacle. The high back of the tank is to prevent any of the barrel's contents being spilled while the barrel is being turned for emptying after the bung has been removed. The trucks are referred to as being strong throughout for transporting heavy loads and are furnished mounted upon iron or rubber wheels.

A Syracuse Hammered Coppered Lamp.

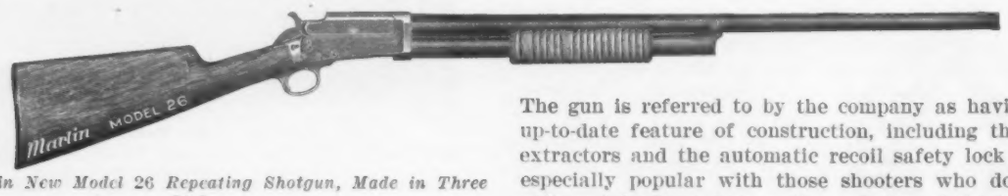
The Syracuse Wire Works, Syracuse, N. Y., manufacturers of artistic metal work in brass, bronze, iron and wire, have put on the market hammered coppered

A Syracuse Hammered Coppered Lamp.

goods, including electric portable lamps, one of which is here shown. The company's line of hammered coppered goods of this character also includes ash trays, service trays, trays for plate rails, tobacco jars, &c.

The Marlin New Model 26 Repeating Shot Gun.

The accompanying illustration represents the new model 26 repeating shotgun put on the market by the Marlin Firearms Company, New Haven, Conn., as a successor to its model 17. It is a 12-gauge non-takedown repeating arm made in three styles, as follows: Standard gun with 30 or 32 in. full choke barrel, for all around shooting; Brush gun with 26-in. cylinder bored barrel, for bird shooting, &c., and a riot gun with 20-in. cylinder bored barrel for buckshot loads, as an effective weapon for watchmen, express messengers, also to have in banks and households as a protection against burglars.



The Marlin New Model 26 Repeating Shotgun, Made in Three Styles.

The gun is referred to by the company as having every up-to-date feature of construction, including the double extractors and the automatic recoil safety lock; also as especially popular with those shooters who do not require a take-down gun, as the omission of the take-down feature saves a number of pieces and makes the gun clean, simple, light and quick. The standard gun weighs about 7½ lb., the Brush gun about 7 lb. and the riot gun about 6⅞ lb.

Monitor Magazine Glass Cutter, No. 200.

The Millers Falls Company, Millers Falls, Mass., and 28 Warren street, New York, has recently introduced the Monitor Glass Cutter No. 200. It is 5⅝ in. long over all and has at the end a magazine and screw cap made from brass and nickel plated, in which to hold six additional steel cutter wheels, making the capacity of the tool 13 cutters in all. The revolving turret in this glass cutter may be removed readily and new wheels introduced as the old ones become dull. Another feature of the tool is that the axles upon which the cutter wheels revolve may be removed and replaced instantly if they become worn. The frame is pressed from steel stock, highly polished and nickel plated. The handle is of cocobola wood, finely polished. The turret is made from steel and held in position by a knurled thumb nut on the back of the frame. It may be revolved to bring the cutter wheel in the proper position by merely loosening the thumb nut. The cutter wheels are made from the best steel for this purpose and scientifically hardened, each wheel being carefully tested.

Monitor Glass Cutter, No. 200, with Magazine Handle.

Ornamental Lawn Fabric.

The H. L. Brown Fence & Mfg. Company, Norwood, Ohio, is making 10 new designs of ornamental lawn fabric for spring delivery. Included in these are four designs of absolutely chicken proof ornamental fabric, which the company states is the smallest mesh ornamental fabric woven. There are also new designs in trellis and flower bed guards.

PAINTS, OILS AND COLORS

Animal, Fish and Vegetable Oils—

	℔ gal. bbl. lots
Linseed, Western, Raw	.62 @63
State, Raw	.62 @63
City Raw	.63 @64
Boiled, 1¢ ℔ gal, advance on Raw.	
Raw, Calcutta, in bbls	.75 @..
Lard, Prime Winter	1.05@1.08
Extra No. 1	.59 @62
No. 1	.53 @54
Cotton-seed, Crude, f.o.b. mill	5.93@6.08
Summer, Yellow, prime	7.05@7.15
Summer, White	7¼@ 7½
Yellow, Winter	7¼@ 7¾
Tallow Oil, Acidless	.57 @60
Menhaden, Brown, Strained	.29 @31
Northern, Crude	@..
Southern	.24 @25
Light Strained	.29 @31
Bleached Winter	.32 @..
Extra Bleached Winter	.34 @..
Cocoanut, Ceylon ℔ lb	8½@10½
Cochin	9½@10½
Cod, Domestic, Prime	.38 @40
Newfoundland	.40 @44
Red Elaine	.49 @51
Saponified ℔ lb	6½@ 7¼
Olive, Yellow	1.20@..
Neatsfoot, Prime	..@62
Palm, Lagos ℔ lb	6.40@ 6½

Mineral Oils—

	℔ gal.
Black, 29 gravity, 25@30 cold test	12½@13
29 gravity, 15 cold test	.13 @13½
Summer	.12 @12½
Cylinder, light filtered	.20 @20½
Dark, filtered	17½@18
Paraffine, 903-907 sp. gravity	.14 @14½
903 sp. gravity	.13 @13½
883 sp. gravity	10½@11
Red	.13 @13½

Miscellaneous—

Barytes:	
White, Foreign ℔ ton	$18.50@20.50
Amer., floated ℔ ton	17.00@18.00
Off color ℔ ton	12.50@15.00
Chalk in bulk ℔ ton	3.00@ 3.40
China Clay, Imported ℔ ton	11.50@18.00
Cobalt, Oxide ℔ 100 lb	1.45@ 2.60
Whiting, Commercial ℔ 100 lb	45@50
Gilders ℔ 100 lb	.52@ .64
Ex. Gilders ℔ 100 lb	.56@ .68

Putty, Commercial—℔ 100 lb

In bladders	$1.70@2.00
In bbls. or tubs, 100 lb	1.20@1.45
In 1 lb to 5 lb tins	2.65@3.25
In 12½ to 50 lb tins	1.50@1.90

Spirits Turpentine—℔ gal.

In Oil bbls	58½@59
In Machine bbls	.59 @59½

Glue—

	℔ lb
Cabinet	.12 @15
Common Bone	7½@ 9
Extra White	.18 @24
Fish, liquid, 50 gal. bbls., per gallon	.60 @1.20
Foot Stock, White	.12 @14
Foot Stock, Brown	.9 @11
German Common Hide	.10 @12
German Hide	.12 @18
French	.10 @40
Irish	.13 @16
Low Grade	.10 @12
Medium White	.14 @19

Gum Shellac—

	℔ lb
Bleached, Commercial	.16 @17
Bone Dry	.20 @21
Button	.20 @30
Diamond I	.24 @25
Fine Orange	.18 @20
A. C. Garnet	15½@16
Light Orange	.17 @19
Kala Button	.13 @15
D. C	23½@24
Octagon B	.20 @22
T. N	14½@16
V. S. O	21½@22

Colors in Oil—

	℔ lb
Black, Lampblack	.12 @14
Blue, Chinese	.36 @46
Blue, Prussian	.32 @36
Blue, Ultramarine	.13 @16
Brown, Vandyke	.11 @14
Green, Chrome	.12 @16
Green, Paris	@24
Sienna, Raw	.12 @15
Sienna, Burnt	.12 @15
Umber, Raw	.11 @14
Umber, Burnt	.11 @14

White and Red Lead, &c.—

	℔ lb
Lead, English White, in Oil	9½@ 9¾
Lead, American White:	
Dry and in Oil, 100, 250 and 500 lb kegs	6¾
Dry and in Oil, 25 and 50 lb kegs	7
Dry and in Oil, 12½ lb kegs	7¼
In Oil, 25 lb tin pails	7¼
In Oil, 12½ lb tin pails	7¾
In Oil, 1, 2, 3 and 5 lb tin cans, ass't	8¾
Red Lead and Litharge:	
In 100 lb kegs	7
In 25 and 50 lb kegs	7¼
In 12½ lb kegs	7½
In lots of less than 500 lbs, ½¢ ℔ lb advance over above prices of White and Red Lead and Litharge.	
Lead, American. Terms: On lots of 500 lbs and over, 60 days, or 2% for cash if paid in 15 days from date of invoice.	

Zinc, Dry—

	℔ lb
American, dry	5¾@ 6½
Red Seal (French process)	6¾@ 7
Green Seal	7¼@ 7½
German Red Seal (French process)	7½@ 7⅝
Green Seal	7¾@ 8
White Seal	8⅝@ 9
French, Red Seal	7½@ 8¼
Green Seal	10 @10¾

Dry Colors—

	℔ lb
Black, Carbon	.5 @10
Black Drop, American	3½@ 8
Black Drop, English	.5 @15
Black, Ivory	.16 @20
Lamp, commercial	.3 @ 5
Blue, Celestial	.4 @ 6
Blue, Chinese	.30 @31
Blue, Prussian, Domestic	.28 @30
Blue, Ultramarine	.5 @15
Brown, Spanish	½@ 1
Carmine, No. 40	2.65@2.75
Green, Chrome, ordinary	3½@ 5
Green, Chrome, pure	.17 @25

	℔ ton.
Metallic Paint, Brown	$16.50@$22.00
Red	$14.00@$18.00
Ocher, American ℔ ton	$13.00@15.00
American Golden	1 @ 5
French	1¼@ 2
Foreign Golden	3 @ 4
Orange Mineral, English	.10 @12
French	12¾@13
German	.12 @13
American	8½@10
Red, Indian, English	.5 @ 7
American	.3 @ 3¼
Red, Turkey, English	.4 @10
Red, Tuscan, English	.7 @10
Red, Venetian, Amer. ℔ 100 lb	$0.75@1.50
English ℔ 100 lb	$1.15@1.60
Sienna, Italian, Burnt and Powdered	.3 @ 9
Italian, Raw, Powdered	.3 @ 7
American, Raw	2¼@ 3
American Burnt and Pow'd	2¼@ 3
Talc, French ℔ ton	$13.00@25.00
American ℔ ton	5.00@25.00
Terra Alba, French ℔ 100 lb	.80@1.00
English ℔ 100 lb	.90@1.00
American ℔ 100 lb, No. 1	.75@ .80
American ℔ 100 lb, No. 2	.60@ .65
Umber, T'key. Bnt. & Pow	2¾@ 3
Turkey, Raw and Powdered	2¾@ 3
Burnt, American	2 @ 2½
Raw, American	2 @ 2½
Yellow, Chrome, Pure	12¾@13
Oxide Red, American	2 @ 7½
Vermilion, English, Imported	@70
Chinese	$0.90@1.00

THE IRON AGE

The oldest paper in the world devoted to the interests of the Hardware, Iron, Machinery and Metal Trades, and a standard authority on all matters relating to those branches of industry.

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Current Hardware Prices.

General Goods.—Goods which are made by more than one manufacturer are printed in *Italics*. The prices named represent those obtainable by the fair retail Hardware trade, whether from manufacturers or jobbers. Very small orders and broken packages often command higher prices, while lower prices are usually given to larger buyers.

Special Goods.—Quotations printed in small type (Roman) relate to goods of particular manufacturers, who request the publication of the prices named and are responsible for their correctness. They usually represent the prices to the small trade, lower prices being generally obtainable by the fair retail trade, from manufacturers or jobbers.

Range of Prices.—A range of prices is indicated by means of the symbol @. Thus 33⅓ @ 33⅓ & 10% signifies that the price of the goods in question ranges from 33⅓ per cent. discount to 33⅓ and 10 per cent. discount.

Names of Manufacturers.—For the names and addresses of manufacturers see the advertising columns and also THE IRON AGE DIRECTORY, issued annually, a book of 376 pages, which is sent free of charge to every subscriber to *The Iron Age*. It gives a classified list of the products of our advertisers and thus serves as an up-to-date DIRECTORY of the Iron, Hardware and Machinery trades.

Standard Lists.—"The Iron Age Standard Hardware Lists," 218 pages, price $2, prepaid, contains the list prices of many leading goods.

Additions and Corrections.—The trade are requested to suggest any improvements with a view to rendering these quotations as correct and as useful as possible to Retail Hardware Merchants.

Adjusters, Blind—

North's 10%
Upson's Patent.....25%
Zimmerman's—See Fasteners, Blind.

Window Stop—

Ives' Patent.....25%
Ives' Stop Bead Screws and Washers 25%
Taplin's Perfection.....25%

Anti—Rattlers—

Fernald Mfg. Co. Burton Anti-Rattlers, ℔ doz. pairs, Nos. 1, $0.75; 2, $0.60; 3, $0.65; 4, $1.00; 5, $1.50.
Quick Shifter, ℔ doz. pairs..... $2.00@$3.00
Spitzli Quick Shifter, ℔ doz. pairs .....$1.65@$1.75

Anvils—American—

Eagle Anvils .....℔ lb @9 ¢
Hay-Budden, Wrought.....9½@9¾ ¢
Trenton .....℔ lb 9½@9¾ ¢

Imported—

Swedish Solid Steel Paragon, ℔ lb .....9½@9¾ ¢
Peter Wright & Sons, ℔ lb, 84 to 349 lb, 10½ ¢; 350 to 600 lb, 11¢.

Anvil, Vice and Drill—

Millers Falls Co., $18.00.....15&10%

Augers and Bits—

Com. Double Spur.....80%
Jennings' Patn., Bright.65&10@70%
Black Lip or Blued...65@65&5%
Boring Mach. Augers.....70%
Car Bits, 12-in. twist.....40&10%
Ford's Auger and Car Bits.....40&5%
Ft. Washington Auger Co.....35%
Forstner Pat. Auger Bits.....25%
C. E. Jennings & Co.:
No. 10 ext. lip, R. Jennings' list, 25&7½%
No. 30, R. Jennings' list.....50%
Russell Jennings'.....25&13&2½%
Mayhew's Countersink Bits.....45%
Pugh's Black.....20%
Pugh's Jennings' Pattern.....35%
Snell's Auger Bits.....60&10%
Snell's Bell Hangers' Bits.....60%
Snell's Car Bits, 12-in. twist.....60%
Snell's King Auger Bits.....50%
Snell's Star Auger Bits.....50&10%
Swan's Auger Bits.....65&10&70%
Swan's, Jennings' Pattern.....50%

Bit Stock Drills—

See *Drills, Twist.*

Expansive Bits—

Ford's, Clark's Pattern.....66⅔%
C. E. Jennings & Co., Steer's Pat..25%
Lavigne Pat., small size, $18.00; large size, $26.00.....60&10%
Swan's 60%

Gimlet Bits—

Per gro.
Common Dbl. Cut.....*$3.00@3.25*
German Pattern, Nos. 1 to 10, $4.75; 11 to 13, $5.25

Hollow Augers—

Bouncy Pat., per doz..$5.50@6.00
Ames .....20&10%
Universal 20%

Ship Augers and Bits—

Ship Augers.....40&10@50%
Ford's .....33⅓&5%
C. E. Jennings & Co.:
L'Hommedieu's 6%
Watrous' .....33⅓&7½%
Snell's 50%

Awls—

Elmore Tool Mfg. Co.:
Tinners' and Brad Awls.....55&7½%
Scratch Awls.....60%

Axes—

Single Bit, base weights: Per doz.
First Quality.....$4.75@5.00
Second Quality.....$4.25@4.50
Double Bit, base weights:
First Quality.....$7.00@7.50
Second Quality.....$6.50@6.75

Axles—

Iron or Steel.

Concord, Loose Collar...4¼@4½¢
Concord, Solid Collar....4½@5 ¢
No. 1 Common, Loose...3½@4 ¢
No. 1½ Com., New Style.4¼@4¾¢
No. 2 Solid Collar.....4¼@4¾¢
Half Patent:
Nos. 7, 8, 11 and 12.....70%
Nos. 13 to 14.....70%
Nos. 15 to 18...70&10@70&10&5%
Nos. 19 to 22...70&10@70&10&5%

Boxes, Axles—

Common and Concord, not turned .....*lb., 5@6¢*
Common and Concord, turned, lb., 6@7¢
Half Patent.....*lb.*, 9½@10¢

Bait—

Fishing—

Hendryx:
A Bait.....20%
B Bait.....25%
Competitor Bait.....20&5%

Balances—

Sash—

Caldwell new list.....50&10%
Pullman .....50&10%

Spring—

Light Spring Balances.50&10@60%
Chatillon's:
Light Spg. Balances.....50&10@60%
Straight Balances.....40&10@50%
Circular Balances.....50&5@60%
Large Dial.....30@30&10

Barb Wire—See *Wire, Barb.*

Bars—

Crow—

Steel Crowbars, 10 to 40 lb. per lb., 2¾@3¢

Prying and Pinch—

Elmore Tool Mfg. Co.....75%

Towel—

No. 10 Ideal, Nickel Plate..℔ gro. $8.50

Beams, Scale—

Scale Beams.....40@40&10%
Chattillon's No. 1.....30%
Chatillon's No. 2.....40%

Beaters,

Carpet—

Holt-Lyon Co.:
No. 12 Wire Coppered ℔ doz. $0.80; Tinned $0.85
No. 11 Wire Coppered ℔ doz. $1.15; Tinned $1.20
No. 10 Wire Tinned.....℔ doz. $1.50

Beaters Egg—

Dover Stamping & Mfg. Co.:
Genuine Dover, per gro., No. 1, Tumbler Size, $7.50; No. 2, Family Size, $7.50; No. 3, Extra Family Size, $24.00; No. 4, Hotel Size, $39.00.
Holt-Lyon Co.:
Holt, per doz., No. 5, Jap'd. $0.80; No. A, Jap'd, $1.15; No. B, Jap'd, $1.85. No. 6, Jap'd, $1.65.
Lyon, Jap'd, per doz., No. 2, $1.35.
Taplin Mfg. Co.:
Improved Dover, per gro., No. 60, $6.00; No. 75, $6.50; No. 100, $7.00; No. 102, Tin'd, $8.50; No. 150, Hotel, $15.00; No. 152, Hotel Tin'd, $17.00; No. 200, Tumbler, $8.50; No. 202, Tumbler Tin'd, $9.50; No. 300, Mammoth, per doz., $25.00.

Bellows—

Blacksmith, Standard List:
Split Leather.....60@60&10%
Grain Leather.....50@50&10%

Net Prices.

Hand—

Inch..	*6*	*7*	*8*	*9*	*10.*
Doz..	*$4.50*	*5.50*	*6.00*	*7.00*	*7.50*

Molders—

Inch..	*10*	*12*	*14*	*16*
Doz..	*$8.50*	*11.00*	*13.50*	*14.50*

Bells—

Cow—

Wrought Cow Bells.....75%
Jersey .....75&10%
Texas Star.....50%

Door—

Reading Hardware Co.....50%
Home, R. & B. Mfg. Co.'s.....55&10%

Hand—

Polished, Brass.....60@60&10%
White Metal.....60@60&10%
Nickel Plated.....50&10%
Swiss .....50&10%

Miscellaneous—

Farm Bells.....*lb.*, 2½@3¢
Church and School....60@60&5%

Belting—

Leather—

Extra Hvy. Single and Dble..55%
Heavy, Single and Double...60%
Medium, Single and Double. 60&10%
Light, Single and Double. 60&10%
Shoulder, Single and Double.75%
Standard .....70&10%
Cut Leather Lacing, Strictly No. 1.....45%
Leather Lacing Sides, per sq. ft, Raw Hide, No. 1, in sides 17 sq. ft. and over, 27¢; No. 2, under 17 sq. ft.....26¢

Rubber—

Competition (Low Grade), 70&10@75%
Standard .....60&10@70%
Best Grades.....50@50&10%

Benders and Upsetters, Tire—

Green River Tire Benders and Upsetters 20%

Bicycle Goods—

John S. Leng's Son & Co.'s 1909 list:
Chain, Parts, Spokes.....50%
Tubes 60%

Blocks

Tackle—

Common Wooden.....75@75&10%
Lane's Patent Automatic Lock and Junior 30%
See also Machines, Hoisting.

Boards, Stove—

Paper and Wood Lined.50&10@60%
Embossed .....50&10@60%

Bobs, Plumb—

Keuffel & Esser Co.....33⅓&10%

Bolts

Carriage, Machine, &c,—

Common Carriage (cut thread):
⅜ x 6 and smaller.....70&7½%
Larger and longer.....65&5%
Common Carriage (rolled thread):
⅜ x 6, smaller and shorter, 70&12½%
Phila. Eagle, $3.00 list...80&—%
Bolt Ends, with C. & T. Nuts, 65&5%
Machine (Cut Thread):
⅜ x 4 and smaller....70&12½%
Larger and longer.....65&10%

Door and Shutter—

Wrought Iron:
Wrought Barrel Japanned, 80&10&10@85%
Barrel Bronzed.....60&10@70%
Spring .....70&10&10@80%
Square Neck.....75&10@80%
Square .....80@80&10%
Ives' Mortise Door.....25%
Ives' Wrought Door.....25%

Expansion—

F. H. Evans' Crescent.....40@60%
Richards Mfg. Co.....55&10%
Star Expansion Bolt Co.:
Star, Lag Screw Type..60&10&5&2½%
Star, Wood Screw Type..... 40%
Star, Machine, Single Wedge.....60%
Star, Machine, Double Wedge.60@10%
Star Toggle Bolts.....60%
Steward & Romain Mfg. Co.:
Style No. 13, Double.....60@10%
Style No. 1, Single.....60@10%
Style No. 100, Dbl. Jaw, Single..55%
Lag Screw.....66⅔%
Star Screw Anchors, Hollow.....40%

Plow and Stove—

Plow .....65&5@70%
Stove .....85&5@85&10%

Tire—

Common Iron.....80%
Norway Iron.....80%
American Screw Co.:
Norway Phila., list Oct. 16, '84..80%
Eagle Phila., list Oct. 16, '84. 82½%
Bay State, list Dec. 28, '99.....80%
Franklin Moore Co.:
Norway Phila., list Oct. 16, '84..80%
Eagle Phila., list Oct. 16, '84..82½%
Eclipse, list Dec. 28, '99.....80%
Russell, Burdsall & Ward Bolt & Nut Co.:
Empire, list Dec. 28, '99.....80%
Norway Phila., list Oct. '84.....80%
Eagle 82½%
Shelton Co.:
Tiger Brand, list Dec. 28, '99...80%
Phila., Eagle, list Oct. 16, 1884..82½%
Upson Nut Co.:
Tire Bolts.....80%

Borers, Bung—

Enterprise Mfg. Co., No. 1, $1.25; No. 2, $1.75; No. 3, $2.50 each.....25%

Boxes, Mitre—

C. E. Jennings & Co.....25%
Langdon, New Langdon and Langdon Improved, 20&10%; Langdon Acme .....15&10%

Braces—

Common Ball.....*$1.50@$1.75*
Barber's .....50&10&10@60&10%
Fray's Genuine Spofford's.....60%
Fray's No. 61, 166, 206, 614.....50%
C. E. Jennings & Co.....50&5%
Mayhew's Ratchet.....40%
Mayhew's Quick Action Hay Patent .....40&10%
Millers Falls Drill Braces.....25&10%
P. S. & W. Co., Peck's Pat Revised List.....60@60&5%

Brackets—

Wrought Steel.....80@80&5%
Griffin's Pressed Steel.....75@75&10%
Griffin's Folding Brackets.....70&10%
Stanley's Pressed Steel.....75&10&5%
Stanley's Folding Brackets..70&10&5%
Taplin Victor Handy Egg Beater Bracket .....℔ doz. $1.50

Broilers—

Kilbourne Mfg. Co.....75&20%
Wire Goods Co.....75&10%

Butts—

Brass—

Wrought 65%
Cast Brass, Tiebout's.....40&10%

Wrought Steel—

BRIGHT.
Light Narrow, Light Reversible .....75&5%
Reversible and Broad.75&10%
Loose Joint, Narrow, Light Inside Blind, &c.....75%
Back Flaps, Table Chest.70%
BRONZED.
Light Narrow, Loose Pin..55%
Light, Loose Pin, Ball Tip.65%
Broad 55%

Extra, 5@—

Cages, Bird—

Hendryx Brass: Series 3000, 5000, 1100, net list: 1200, 15%; 200, 300, 900 .....30%
Hendryx Bronze: Series 700, 800....30%
Hendryx Enameled.....35%

Calks, Toe and Heel—

Blunt, 1 prong, per 100 lb. ..... $3.80@$4.00
Sharp, 1 prong, per 100 lb. ..... $4.30@$4.50
Burke's, 1 pg. Blunt Toe, 3¾¢; 2 pg. Blunt Toe, 4¼¢; 1 pg. Sharp Toe, 4¼¢; 2 pg. Sharp, 4¾¢; Blunt Heel, 4¼¢; Sharp Heel ..... 4¾¢
Perkins', Blunt, ₱ lb, 3.65¢; Sharp, 4.15¢

Caps— Primers—

Berdan Primers, $2 per M ..... 20&5%
Primer Shells and Bullets ..... 15&10%
All other primers per M ..... $1.52@1.60

Cartridges—

Blank Cartridges:
32 C. F., $5.50 ..... 10&5%
38 C. F., $7.00 ..... 10&5%
22 cal. Rim, $1.50 ..... 10&5%
32 cal. Rim, $2.75 ..... 10&5%
B. B. Caps, Con. Ball, Swgd $1.90
B. B. Caps, Round Ball $1.40
Central Fire 25%
Target and Sporting Rifle ..... 15&5%
Primed Shells and Bullets ..... 15&10%
Rim Fire, Sporting 50%
Rim Fire, Military ..... 15&5%

Casters—

Bed ..... 65&10@70%
Plate ..... 60@60&10%
Philadelphia ..... 70&10@75%
Gem (Roller Bearing) ..... 70&10&10&5%
Steel Gem (Roller Bearing) 70%
Standard Ball Bearing 45%
Yale (Double Wheel) low list ..... 40&10%

Chain, Proof Coil—

American Coil, Straight Link:

3-16	¼	5-16	⅜	½	⅝
$7.70	5.05	4.10	3.50	3.35	3.25

¾-⅞-1. 1⅛ to 1¼ inch.
$3.15 3.25
German Coil ..... 70&5%
German Pattern Coil:
6-0 to 1 ..... 70&10&5%
2 and 3 ..... 60&10&10@70%
4, 5 and 6 ..... 50&10@50&10&5%

Halter—

Halter Chains ..... 60&5@60&10%
German Pattern Halter Chains, list July 24, '97 ..... 70&5%
Covert Mfg. Co.:
Halter ..... 30&10&10%

Trace, Wagon, &c.—

Traces, Western Standard: 100 pr.
6½—6-3, Straight, with ring $26.00
6½—6-2, Straight, with ring $27.00
6½—8-2, Straight, with ring $30.00
6½—10-2, Straight, with ring $35.00
NOTE.—Add 2c per pair for Hooks Twist Traces: add per pair for Nos. 2 and 3, 2c; No. 1, 3c; No. 0, 4c to price of Straight Link.
Eastern Standard Traces, Wagon Chain, &c ..... 70&10@—%

Miscellaneous—

Jack Chain:
Iron ..... 60&10&10@70%
Brass ..... 60&10&10@70%
Safety and Plumbers' Chain 75%
Gal. Pump Chain ..... lb., 4½@5%
Bridgeport Chain Co.:
Triumph Halter and Coil ..... 35&2½@40%
Triumph Dog ..... 50&10@60%
Brown Halter and Coil ..... 45@50&5%
Covert Mfg. Co.:
Breast, Halter, Heel, Rein, Stallion, Post ..... 30&10&10%
Oneida Community:
American Halter, Dog and Kennel Chains ..... 35&2½@40%
Niagara Dog Leads and Kennel Chains ..... 45@50&5%
Wire Goods Co.:
Dog Chain 70%
Universal Dbl.-Jointed Chain ..... 50&10%

Chain and Ribbon, Sash—

Oneida Community:
Steel Chain 60%
Pullman:
Bronze Chain, 60%; Steel Chain, Coppered ..... 60&10%
Sash Chain Attachments, per set ..... 88¢
Aluminoy Sash Ribbon, per 100 ft. ..... $2.00@$5.00
Sash Ribbon Attachments, per set ..... 8¢

Chalk—

Carpenters' Blue .... gro., 50@55¢
Carpenters' Red .... gro., 50@55¢
Carpenters' White .... gro., 40@45¢

Checks, Door—

Bardsley's 33⅓%
Reading, Ogden ..... 20&5%
Pullman, per gro. $54.00
Russwin 33⅓%

Chests, Tool—

American Tool Chest Co.:
Boys' Chests, with Tools 55%
Youths' Chests, with Tools 40%
Gentlemen's Chests, with Tools 30%
Farmers', Carpenters, etc., Chests, with Tools 20%
Machinists' and Pipe Fitters' Chests, Empty 45%
Tool Cabinets 15%
C. E. Jennings & Co.'s Machinists' Tool Chests 7½%

Chisels—

Socket Framing and Firmer

Standard List ..... 80&10@—%
Buck Bros. 30%
C. E. Jennings & Co.:
Socket Firmer No. 10 ..... 25&7½%
Socket Framing No. 15 ..... 25&7½%
R. & E. Mfg. Co. ..... 70@70&10%
Swan's ..... 60&5@70%
L. & I. J. White & Co. ..... 30@30&5%

Tanged—

Tanged Firmers ..... 35&10@40%
Buck Bros. 30%
C. E. Jennings & Co. Nos. 191, 181 ..... 25%
R. & E. Mfg. Co. ..... 25@30&5%
L. & I. J. White Co. ..... 25&5%

Box—

Elmore Tool Mfg. Co. 50%

Cold— lb.

Cold Chisels, good quality ..... 13@15¢
Cold Chisels, fair quality ..... 11@12¢
Cold Chisels, ordinary ..... 9@10¢
Elmore Tool Mfg. Co.:
Cold Chisels ..... 50&5%

Chucks—

Almond Drill Chucks 35%
Almond Turret Six-Tool Chuck 40%
Beach Pat, each $8.00 ..... 35&5%
Cincinnati Chuck Co.:
Independent 4-jaw Reversible 35%
Jacobs' Drill Chucks 35%
Skinner Lathe Chucks:
Independent 35%
Universal, Reversible Jaws 35%
Universal, Com. Style Jaws 40%
Combination, Reversible Jaws 35%
Combination, Com. Style Jaws 40%
Round Body or Box Body, 2 Chuck Jaws 25%
Geared Scroll Chucks 25%
Drill Chucks:
New Model, 25%; Geared Pattern, 25%; Skinner Patent, ... 25%
Positive Drive 40%
Planer Chucks 20%
Standard 45%
Drill Press Vises 30%
Face Plate Jaws 35%
Standard Tool Co.:
Improved Drill Chuck 45%
Union Mfg. Co.:
Combination, Nos. 1, 2, 3, 4, 5, 6, 7, 8 and 17, 40%; No. 21 ..... 35%
Scroll Combinations, Nos. 83 and 84 ..... 30%
Geared Scroll, Nos. 33, 34 and 35 ..... 25%
Independent Iron, Nos. 18 and 318 ..... 35%
Independent Steel, No. 64 ..... 25%
Union Drill, Nos. 000, 00, 100, 101, 102, 103, 104 ..... 35%
Union Czar Drill 25%
Union Geared Drill Chuck 25%
Universal, 11, 12, 16, 17, 13, 14, 15 ..... 40%
Universal No. 42 ..... 35%
Iron Face Plate Jaws, Nos. 28, 30, 48 and 50 ..... 35%
Steel Face Plate Jaws, Nos. 70 and 72 ..... 30%
Westcott Patent Chucks:
Lathe Chucks 50%
Little Giant Auxiliary Drill 50%
Little Giant Double Grip Drill 50%
Little Giant Drill, Improved 50%
Oneida Drill 50%
Scroll Combination Lathe 50%

Clamps—

Carriage Makers', Star, P., S. & W. Co. ..... 50@50&5%
Besly, Parallel ..... 33⅓&10%
Hammer & Co.:
Adjustable ..... 20&5%
Carriage Makers' H. P. Screw ..... 40&5%
Myers', Standard and Wenzelmann Hay Rack 50%
Saw Clamps, see Vises, Saw Filers'

Cleaners, Drain,

Iwan's Champion, Adjustable 50%
Iwan's Champion, Stationary ..... 40&5%

Cleavers, Butchers'—

Foster Bros. 30%
L. & I. J. White Co. 30%

Clippers, Horse and Sheep—

Chicago Flexible Shaft Co.:
1902 Chicago Horse, each $10.75
20th Century Horse, each $5.00
Lightning Belt Horse, each $15.00
Chicago Belt Horse, each $20.00
Stewart's Enclosed Gear Ball Bearing Horse, each $7.50
Stewart's New Model Sheep Shearing Machine, each $12.75
Stewart Enclosed Gear Shearing Machine, No. 8, each $9.75
} ₱ doz.

Clips, Axle—

Regular Styles ..... 80&80&10%

Cocks, Brass—

Hardware list:
Plain Bibbs, Globe, Kerosene, Racking, Liquor, Bottling, &c 75%
Compression Bibbs 75%

Compasses, Dividers, &c.

Ordinary Goods ..... 75@75&5%

Conductor Pipe,—

All territories, L. C. L.
Galvanized Steel ..... 75&10&5@—%
Charcoal ..... 50&10&7½@—%
Copper ..... 50&10@—%
Terms, 60 days · 2% cash 10 days. Factory shipments generally delivered.
See also Eave Troughs.

Coolers, Water—

L. & G. Mfg. Co.:

Galvanized, Lined, side handles, Gal....	2	3	4	6	8
Each ...	$1.30	1.60	2.00	2.30	3.00
White Enameled Lined, Side Handles: Gal....	2	3	4	6	8
Each ...	$2.40	2.80	3.50	4.50	5.60
Agate Lined, Side Handles: Gal....	2	3	4	6	8
Each ...	$3.00	3.40	4.30	5.30	6.60

10%

Coppers, Soldering—

Soldering Coppers, 3 lb. to pair and heavier, 21¢; lighter than 3 lb. to pair ..... 23¢

Cord— Sash—

Braided, Drab ..... lb. 35¢
Braided, White, Com., Nos. 8 to 12, 27¢; No. 7, 27½¢; No. 6, 28½¢.
Cable Laid Italian, lb., No. 18, 37¢
Italian, lb., A, No. 18, 25¢; B, 22¢
Common India ..... lb. 16@17½¢
Cotton Sash Cord, Tw'td. 18½@22¢
Patent Russia ..... lb. ..... 20¢
Cable Laid Russia ..... lb. ..... 21¢
India Hemp, Br'd'd ..... lb. ..... 21¢
India Hemp, Twisted ..... lb. 13@14¢
Patent India, Twisted ..... lb. ..... 17¢
Eddystone Braided, Nos. 8 to 12, 26¢; 7, 26½; 6, 27½¢.
Harmony Cable Laid Italian, Nos. 7 to 10 ..... ₱ lb 23¢
Pullman:
Wire Sash Cord 10%
Sash Cord Attachments, per 100 ..... $2.00
Samson, Nos. 8 to 12:
Braided, ₱ lb., Drab Cotton, 55¢; Italian Hemp, 40¢@50¢; Linen, 65¢; White Cotton, 50¢; Spot Cord ..... 50¢
Massachusetts, White ..... ₱ lb 40¢
Massachusetts, Drab ..... ₱ lb 45¢
Phoenix, White, Nos 8 to 12 ..... 27¢
15%
Silver Lake, per lb.:
A, Drab, 45¢; A, White, 40¢; B, Drab, 40¢; B, White, 35¢; Italian Hemp, 40¢; Linen ..... 57½¢
See also Chain and Ribbon.

Wire, Picture—

Full Length ..... 90@—%
Short Length ..... 90&20@—%
Hendryx Standard Wire Picture Cord ..... 90&10%
Turner & Stanton Co. Wire Picture Cord ..... 90&10%

Cradles—

Grain 50%

Crayons—

White Round Crayons, Cases, 100 gro., $8.00, $8.50, $9.00 and $10.00 according to grade.
Zelnicker's Lumber: ₱ gro.
White and Purple, Indelible $7.50
Blue, Red, Green, Yellow and Terra Cotta, $6.50; Black $4.50
Giant Lumber, 5¼ in. x 15-16 in. round, all colors, $12.00; Indelibles, $14.00; Blacks $10.00
Genuine Soapstone, Metal Workers', 5 in. x ¼ in. Round, $2.50; 5 in. x ¼ in. Square, $1.75; 5 x ½ x 3-16, $2.50; 5 x 1¼ x 3-16 ..... $3.00
Suremark, Black, $2.25; Blue, Red and Yellow $2.50

Cutlery, Table—

International Silver Company:
No. 12 M'd'm Knives, 1847, ₱ doz. $3.50
Star, Eagle, Rogers & Hamilton and Anchor ..... ₱ doz. $3.00
Wm. Rogers & Son ..... ₱ doz. $2.50

Cutters— Glass—

H. H. Mayhew Co. ..... 40&5%

Meat and Food—

Enterprise:

Nos..	5	10	12	22	32
Each	$1.75	$2.50	$2.25	$4	$5

No. 202, $1.50 ..... 25@25&7½%
P., S. & W. Co.:
Ideal ..... 40@40&5%
Hales ..... 60&5%
Little Giant ..... ₱ doz. 40@50%

Nos..	305	310	312	320	322
	$35.00	$48.00	$44.00	$72.00	$68.00

New Triumph No. 605, ₱ doz. $24.00,
Russwin Food, No. 1, $24.00; No. 2, $27.00; 3, $12.00 ..... 45&10&10%
$15.00 $18.00

Slaw and Kraut—

Henry Disston & Sons:
Slaw and Kraut Cutters 35%
Corn Graters 30%
J. M. Mast Mfg. Co.:
Slaw Cutters, 1 Knife ..... ₱ doz. $3.00
Combined Slaw Cutter and Corn Grater ..... ₱ doz. $4.00

Tobacco—

Enterprise ..... 25@30%

Diggers, Post Hole, &c—

Disston's:
Rapid, ₱ doz., $24.00 ..... 25%
Samson, ₱ doz., $34.00 ..... 25%
Iwan's Pat. Post Hole and Well Auger 40%
Vaughan Pattern Post Hole Augers, 4 to 9 in., ₱ doz. $4.25
Perfection Post Hole Diggers, ₱ doz. $8.25
Split Handle Post Hole Diggers, ₱ doz., $7.25
Hercules Pattern, ₱ doz. $8.75
Kohler's, ₱ doz., Universal, $14.00; Little Giant, $12.00; Genuine Hercules, $10.00; Invincible, $9.00; Rival, $8.50; Pioneer $7.50
Never-Break Crucible Steel Post Hole Diggers 60%

Dressers Emery Wheel—

Sterling Emery Wheel Dressers 35%
Sterling Wheel Dresser Cutters 35%

Drills and Drill Stocks—

Blacksmith's Common Drilling Machines ..... $1.50@1.75
Breast, Millers Falls ..... 15&10%
Breast, P., S. & W. ..... 30&10%
C. & C. Ratchet 25%
Reversible Ratchet Die Stocks 25%
Forbes Die Stocks 5%
Goodell Automatic Drills ..... 50&10&10%
Millers Falls Automatic Drills, Graves', per doz., Nos. 1, $4.86; 2, $8.16.
Millers Falls Automatic Drills ..... 33⅓&10%
Noyes Repair Shop Drill No. 10 ..... 20%
Ratchet, Parker's 40%
Ratchet, Weston's, Styles A and B 50%
Ratchet, Weston's, Styles C, D and F 45%
Ratchet, Weston's, Style H Improved 45%
Ratchet, No. 012 ..... 50%
Ratchet, Celebrated 50%
Ratchet, Whitney's, P., S. & W. 50%
Star Drills 60%
Star Pipe Drills ..... 50&10%
Sebco Extension Drills ..... 40&10&5%
Star Drill Holders ..... 50&10&10%
Star Drill Points ..... 50&10&10%

Twist Drills—

Bit Stock ..... 65&5@70%
Taper and Straight Shank ..... 60&5@65%

Drivers, Screw—

Buck Bros.' Screw Driver Bits 30%
Disston's Screw Drivers, Handles and Ferrules 70%
Elmore Tool Mfg. Co.:
Elmore 60%
Hartford 66⅔%
Indestructible ..... 55&7%
Standard Nevertorn 66⅔%
Star ..... 75&5%
Screw Driver Bits 25%
Fray's Hol. H'dle Sets, No. 3, $12 ..... 50%
Ford's Brace Screw Drivers ..... 40&10%
Gay's Double Action Ratchet 35%
Goodell's Auto ..... 65@65&10%
Mayhew's Black Handle 45%
Mayhew's Monarch 45%
Millers Falls, ₱ doz., Nos. 11, $9.95; 12, $13.73; 20, $8.17; 21, $8.46; 41, $13.43; 42, $17.21.
Swan's:
Nos. 7565 to 7568, 60%; No. 7540, 40&10%

Eave Trough, Galvanized—

All territories.
Galvanized Steel ..... 80&10&10@—%
Copper ..... 50&10@—%
Terms.—2% for cash. Factory shipments generally delivered.
See also Conductor Pipe and Elbows.

Elbows and Shoes—

Factory shipments, all territories:
Galv. Steel, Galv. C. I. and Copper.
Sizes 2, 3, 4 ..... 80%
Sizes 1½, 2½, 3½, 5, 6 ..... 60&10%
No. 26 ..... 50%
No. 24 ..... 25%
Copper Elbows 50%

Emery, Turkish—

	lb.	¼ to ½:	⅝ to 2:	Flour.
Kegs	lb.	5 ¢	5½¢	3½¢
½ Kegs	lb.	5½¢	5¾¢	3¾¢
¼ Kegs	lb.	5½¢	6 ¢	4 ¢
10-lb. cans, 10 in case	6½¢	7 ¢	6 ¢	
10-lb. cans, less than 10	10 ¢	10 ¢	8 ¢	
Less quantity ..	10 ¢	10 ¢	8 ¢	

NOTE.—In lots 1 to 3 tons a discount of 10% is given.

Extensions, Bit—

Ford's Auger Bit Extensions ..... 40&5%

Extinguishers—Fire

Royal Mfg. Co. Fire, ₱ doz., $12.00 ..... 50%

Fasteners, Blind—

Upson's Patent 25%
Walling's 50%
Zimmerman's Jap'd and Galv., 65%:
Bronze and Plated 50%

Cord and Weight—

Ives, ₱ gro., $1.08 ..... 25%
Titan, ₱ gro., $0.66 ..... 25%

Corrugated—

Acme Corrugated Fasteners.....70%

Faucets—

Cork Lined.....50&10@60%
Metallic Key, Leather Lined, .. 60&10@70%
Red Cedar.....40&5@40&10&5%
Petroleum .....70&10@75%

John Sommer Faucet Co.:
Peerless Tin Key.....40%
Boss Tin Key.....50%
Victor Metal Key.....50&10%
Duplex Metal Key.....60%
Diamond Lock.....40%
I.X.L. Cork Lined.....50%
Reliable Cork Lined.....50&10%
Chicago Cork Lined.....60%
O. K. Cork Lined.....50%
No Brand, Cedar.....50%
Perfection, Cedar.....30%

Self Measuring:
Enterprise, Self Measuring and Pump, ₱ doz., $36.00.....40&10%
Lane's, ₱ doz., $36.00.....40&10%

Files— Domestic—

Best Brands.....70&10@75&10%
Standard Brands.....75&10@80%
Lower Grade....75&10&10@80&10%

Disston's Superfine.....60%
Fitchburg 80
Heller Bros.....70&10@75&10
Liveright Bros., Gold Medal.....70
McCaffrey's American Standard, 60&10&10%
McCaffrey's Swiss Pattern.....45&10%
Simonds 70%

Fixtures, Fire Door—

Richards Mfg. Co.:
Universal, No. 103; Special, No. 104 .....$3.75
Fusible Links, No. 96.....50%
Expansion Bolts, No. 107.....60&10%

Grindstone—

Net Prices:

Inch	*15*	*17*	*19*	*21*
Per doz.....	*$3.00*	*3.25*	*3.55*	*4.00*

Peck, Stow & Wilcox Co.:

In.....	15	17	19	21	24
	$4.00	4.40	4.75	5.50	6.50...20%

Reading Hardware Co.....50&10%

Frames— Wood Saw—

White, S'g't Bar, per doz.80@$1.00
Red, S'g't Bar, per doz.$1.00@1.25
Red, Dbl. Brace, per doz.$1.40@1 50

Freezers, Ice Cream—

Qt.....	*1*	*2*	*3*	*4*	*6*
Each....	*$1.25*	*$1.60*	*$1.90*	*$2.20*	*$2.80*

Fuse— *Per 1000 Feet.*

Hemp $2.75
Cotton 3.20
Waterproof Sgl. Taped.. 3.65
Waterproof Dbl. Taped.. 4.40
Waterproof Tpl. Taped.. 5.15
10&2½%

Gates, Molasses and Oil—

Stebbins' Pattern.....80%

Gauges—

Marking, Mortise, &c..50@50&10%

Chapin-Stephens Co.:
Marking, Mortise, &c.....50&50&10%
Disston's Marking, Mortise, &c.60&10%
Wire, Brown & Sharpe's.....33⅓%
Wire, Morse's.....25%
Wire, P., S. & W. Co.....25%

Gimlets— Single Cut—

Numbered assortments, per gro.
Nail, Metal, No. 1, $2.00; 2, $2.30
Spike, Metal, No. 1, $4.00; 2, $4.30
Nail, Wood Handled, No. 1, $2.50; 2, $2.60
Spike, Wood Handled, No. 1, $4.30; 2, $4.60

Glasses, Level—

Chapin-Stephens Co.....65@65&10%
Disston & Sons.....60&10%

Glue, Liquid Fish—

Bottles or Cans, with Brush, 25&10@50%

Grease, Axle—

Common Grade...gro.$6.00@$6.50
Dixon's Everlasting, 10-lb. pails, ea. 85¢; in boxes, ₱ doz., 1 lb, $1.20; 2 lb.....$2.00
Helmet Hard Oil.....25%

Griddles, Soapstone—

Pike Mfg. Co.....33⅓@33⅓&10%

Grinders—

Pike Mfg. Co.:
Hand and Foot Power, Pyko Nos. 1, 2, 3; Pyko Primo; Pyko Peerless; Pyko Spiral (foot power).33⅓%
Mower Knife and Tool, $5.00..40&10%
Royal Mfg. Co.:
Hand Power, each, Nos. 01, $1.75; 02, $2.25; 1A, $2.50; 1B $3.25.....33⅓%
Foot Power, No. 10, $5.00.....33⅓%
Encased Gears, No. 15, Hand Power, $13.50; Combined Hand and Foot Power, $15.00.....33⅓%
Lawn Mower Grinder, No. 40, $3.75 .....33⅓%
Sickle Grinder, each, No. 20, $5.00 .....33⅓%
Cast or Cut Gears.

Grindstones—

Pike Mfg. Co.:
Improved Family Grindstones, ₱ inch, ₱ doz., $2.00.....33⅓%
Richards Mfg. Co., Eli and Cycle, Ball Bearing, mounted.....40%

Grips, Nipple—

Perfect Nipple Grips.....40&10&2%

Halters and Ties—

Cow Ties.....70&10@—%

Bridgeport Chain Co.:
Triumph Coil and Halters.35&2½@40%
Brown Coil and Halters...45@50&5%
Brown Cow Ties.....50@50&5%
Brown Tie Outs.....70&10@75&5%

Covert Mfg. Co.:
Web .....30&10%
Jute Rope.....55%
Sisal Rope.....45%
Cotton Rope.....55%
Hemp Rope.....45%

Oneida Community:
Am. Coil and Halters.....40@40&5%
Am. Cow Ties.....35&2½@40%
Niagara Coil and Halters...45@50&5%
Niagara Cow Ties.....50%

Hammers—

Handled Hammers—

Heller's Machinists'..65&10@65&10&10%
Heller's Farriers'.....40@40&10%
Peck, Stow & Wilcox Co.:
Crucible Steel.....50%
Farriers' 50%
Riveting 50%
Machinists' 50%
Blacksmiths' 52%
Elmore Shoemakers' Hammers.....75%
Victor Magnetic Tack, ₱ gro....$7.75

Heavy Hammers and Sledges—

3 to 5 lb., 40¢.....80&10&10%
Over 5 lb, 30¢.....80&10&10&10%

Handles—

Agricultural Tool Handles

Axe, Pick, &c...60&10@60&10&10%
Hoe, Rake, &c.....30&5@30&10%
Fork, Shovel, Spade, &c.:
Long Handles.....30&5@30&10%
D Handles.....30&5@30&10%

Cross-Cut Saw Handles—

Atkins' 35%
Disston's Handles and Saw Tabs..45%

Mechanics' Tool Handles—

Auger, assorted...gro.$3.00@$3.50
Brad Awl.....gro.$1.65@$1.75
Chisel Handles, Ass'd, per gro.:
Tanged Firmer, Apple, $2.40@ $2.65; Hickory.....$2.15@2.40
Socket Firming, Apple, $1.75@ $1.95; Hickory.....1.60@1.75
Socket Framing, Hickory, $1.60@$1.75
File, assorted.....gro.$1.25@$1.50
Hammer, Hatchet, &c., 30&10@60&10&5%
Hand Saw, Varnished, doz., 80¢; Not Varnished .....70@75¢
Plane Handles:
Jack, doz., 25¢; Fore, doz..40¢

Chapin-Stephens Co.:
Carving Tool.....30@30&10%
Chisel .....60@60&10%
File and Awl.....60@60&10%
Saw and Plane.....30@30&10%
Screw Driver.....30@30&10%

Millers Falls Adj. and Ratchet Auger Handles .....15&10%
Nicholson Simplicity File Handle.... ₱ gro. $0.85@$1.50

J. L. Osgood:
Indestructible File and Tool, ₱ gro., No. 1, $8.00; No. 2, $8.50; No. 3, $9.00; No. 4, $9.50; No. 5, $10.00.....gro. lots 10%

W. A. Zelnicker Supply Co.:
Hammer, ₱ doz., 12 in., $2.00; 14 in., $2.00; 16 in., $2.30; 18 12., $2.50; 20 in., $2.70; 22 in., $3.00; 24 in., $3.30; 26 in., $3.50; 30 in., $3.80.
Sledge, ₱ doz., oval, 30 in., $3.80; octagon, 30 in., $3.80; oval, 36 in., $4.00; octagon, 36 in., $4.00.
Axe, ₱ doz., 28 to 34 in., $5.60; 36 in., $5.80.
Adze, ₱ doz., 36 in., $5.80; 36 in., $7.80.
Pick, ₱ doz., R. R., 36 in., $8.00; coal, 34 in., $5.80.
Hatchet, ₱ doz., 12 to 14 in., $2.00.
₱

Hangers—

NOTE.—Barn Door Hangers are generally quoted per pair, without track and Parlor Door Hangers per double set with track, &c.

Chicago Spring Butt Co.:
Friction 25%
Oscillating 25%
Big Twin.....25%
Chisholm & Moore Mfg. Co.:
Baggage Car Door.....50%
Elevator 30%
Railroad 50%
Cronk & Carrier Mfg. Co.:
Loose Axle.....60&10%
Roller Bearing.....70%
Griffin Mfg. Co.:
Solid Axle, No. 10, $12.00..60&10%
Roller Bearing, No. 11, $15.00, 60&10%
Roller Bearing, Ex. Hy., No. 22, $18.00.....60&10%
Bull Dog, $24.00.....70%
Lane Bros. Co.:
Parlor, Ball Bearing, $4.00; Standard, $3.15; No. 105, $2.85; New Model, $2.80; New Champion per set of 4 Hangers, complete with track.....$2.25
Barn Door, Standard.....60&10%
Hinged .....net $6.08
Covered .....60&5%
Special .....70&5%
Trolley Hangers and track..50%
Lawrence Bros.:
Cleveland .....70&7½%
Clipper, No. 75.....60%
Crown .....55&10%
Cyclone, No. 40.....net $6.50
Tandem, No. 50.....net $7.50
New York.....55&10%
Trolley, No. 30, ₱ pair.....$1.25
McKinney Mfg. Co.:
Roller Bearing, Nos. 1 and 2..70%
Anti-Friction 60%
Hinged Hangers, King Charm.60%
F. E. Myers & Bro. Stayon; O K; O K Adjustable; Sure Grip; Sure Grip Adjustable; Sure Grip Tandem; Sure Grip Tandem Adjustable; Tandem Adjustable 60%
Richards Mfg. Co.:
Hangers, Nos. 47, 48, 147, 247, 60&5%
Pioneer Wood Track, No. 3..$2.25
Roller B'r'g St'l Track No. 12.$2.20
Roller B'r'g St'l Track No. 13.$2.50
Roller B'r'g, Nos. 39, 41, 43, 70&7½%
Hero, Adj. Track No. 19..50&10%
Adjustable Track Tandem Trolley Track No. 16.....50&10%
Seal, Steel Track No. 8.....$2.25
Auto Adj. Track No. 22..50&5%
Trolley B. D. No. 17, $1.25; F. D. No. 120, $2.25; No. 121, $2.45; No. 150.....$2.50
Safety Underwriters F. D. No. 101 .....50%
Tandem No. 41..2½ and 3 60&10%
Palace, Adjustable Track No. 132 .....50&5%
Royal, Adjustable Track No. 122 .....50&10%
Ives' Wood Track No. 1.....$2.25
Trolley B. D. No. 20.....50&10%
Trolley B. D. No. 24, $1.30; No. 27, $1.40; No. 28.....$1.60
Roller Bearings, Nos. 37, 38, 39, 41, 43, 44, Sizes 1 and 2.70&7½%
Anti-friction, No. 42; No. 44, sizes 2½ and 3.....60%
Hinged Tandem No. 48....60&5%
Folding Door B. B, Swivel No. 135 .....40%

Extra 5@10% often given.

Hangers— Garment—

Pullman Trouser, ₱ gro., No. 1 $9.00; No. 4, $24.00; No. 5, $16.50; No. 8, Black Enamel, $7.50; No. 10, $21.00; No. 12, $8.00; No. 15, Rods, $9.00; No. 18, Loops.....$10.00
Victor Folding.....₱ gro. $9.60

Joist and Timber—

Lane Bros. Co.....35%

Hasps—

Griffin's Security Hasp.....50&10%
McKinney's Perfect Hasp, ₱ doz..60%

Hatchets—

Regular list, first qual.50&10@60%
Second quality.....60@60&10%

Heaters, Carriage—

Clark, No. 5, $1.25; No. 5B, $1.50; No. 3, $1.75; No. 3D, $2.00; No. 1, $3.00 .....25%
Big Hit Assortment, ₱ case....$13.80
Leader, ₱ case.....$9.00
Clark Coal, doz.....$0.75
A B C Coal, doz.....$0.60
Sadiron Coal, box 50 pieces.....$0.75

Hinges—

Blind and Shutter Hinges

Surface Gravity Locking Blind: Doz. Sets with Fastenings, No. 1, $0.75; No. 3, $1.40; No. 5, $2.85.

North's Automatic Blind Fixtures, No. 2, for Wood, $9.00; No. 3, for Brick, $11.50.....10%
Charles Parker Co.....70@75%
Parker Wire Goods Co.
Hale & Benjamin Automatic Blind Hinges 20%
Hale's Blind Awning Hinges, No. 110, for wood, $9.00; No. 111, for brick, $9.00.....20%
Reading's Gravity.....50&10%
Stanley's Steel Gravity Blind Hinges, No. 1647½, ₱ doz. sets, without screws, $1.00; with screws, $1.30.
Wrightsville Hardware Co.:
O. S., Lull & Porter.....75&5%
Acme, Lull & Porter.....75%
Queen City Reversible.....75%
Shepard's Noiseless, Nos. 60, 65, 55 .....75&5%
Niagara, Gravity Locking, Nos. 1, 3 & 5.....75&5%
Clark's O. P., No. 1.....75&10%
Clark's O. P., Nos. 3 and 5....75&5%
Tip Pat'n, No. 1.....75&10%
Clark's No. 3.....75&5%
Buffalo Gravity Locking, Nos. 1, 3 & 5.....70&10&5%
Shepard's Double Locking.....75%
Champion Gravity Locking.....75&5%
Pioneer .....75&10%
Empire 65%
W. H. Co.'s Mortise Gravity Locking, No. 2.....60&10%

Gate Hinges—

Western:
With Latch..... doz. $1.75
Without Latch.....doz..$1.15

Wrightsville Hardware Co.:
Shepard's or Clark's Hinges and Latches, Hinges only or Latches only, Nos. 1, 2 or 3.....70%

Miscellaneous—

Griffin Mfg. Co., Fleur de Lis Surface Hinges, ₱ doz. prs.....$1.00

Pivot Hinges—

Bommer Bros. Pivot, Ball Bearing 40%
Lawson Mfg. Co., Matchless..50&10%

Spring Hinges—

Holdback, Cast Iron..$5.25@$5.75
Non-Holdback, C'st Iron$6.50@$6.75

J. Bardsley:
Simplex Spring Hinges.....40%
Bardsley's Patent Checking.33⅓%
Bommer Bros.:
Spring Butt Hinges.....40%
Surface Floor, Ball Bearing 40%
Mortise Floor, Ball Bearing.40%
Lavatory Hinges.....40%
Non-Holdback Screen Door, Nos. 2000 and 900.....40%
Holdback Screen Door, No. 999.....₱ gro, $9.00
Chicago Spring Butt Co.:
Chicago Spring Hinges.....25%
Triplex Spring Hinges.....50%
Chicago (Ball Bearing) Floor.50%
Chicago Engine House.....25%
Lavatory Door Hinges.....50%
Adjustable Screen Door.....60%
Non-Holdback 65%
Lawson Mfg. Co.:
Matchless Spring Hinges..... 30&10&10%
Matchless Jamb Hinges..... 30&10&10%
Lavatory .....50&10%
Surface Floor.....60&10%
Richards Mfg. Co.:
Superior Double Acting Floor Hinges 40%
Shelby Spring Hinge Co.:
Buckeye All Steel Holdback Screen Door.....₱ gr. $9.00
No. 777, Sheet Steel Holdb'k, ₱ gr.....$9.00
No. 888, Non-Holdback, ₱ gro. $9.00
Chief Ball Bearings Floor Hinge 50%
Ball Bearing Door.....40%
Superior Spring Hinge Co.:
Superior Floor Hinges.....40%
Spring Hinges.....40%

Extra 10% often given on most of these Hinges.

Wrought Iron Hinges—

Strap and T Hinges, &c.:
Light Strap Hinges....65%
Heavy Strap Hinges....75%
Light T Hinges.....60%
Heavy T Hinges....40&10%
Extra Hvy. T Hinges.65&10%
Hinge Hasps.....40%
Cor. Heavy Strap.....75%
Cor. Ex. Heavy T...65&10%
Extra, 5@10%

Screw Hook and Strap. { *6 to 12 in..lb. 3½¢* / *13 to 20 in..lb. 3¼¢* / *22 to 36 in..lb. 3 ¢* }

Screw Hook and Eye:
¾ to 1 inch.....lb.5@5½¢
⅝-inch .....lb.6@6½¢
½-inch .....lb. 7@7½¢

Hitchers, Stall—

Covert Mfg. Co., Stall Hitchers.30&10%

Hods— Coal—

Net, per dozen.

Inch..	*15*	*16*	*17*	*18*
Galv., open....	*$2.15*	*2.40*	*2.55*	*2.80*
Jap., open.....	*1.65*	*1.75*	*1.90*	*2.30*
Galv., funnel...	*2.60*	*2.90*	*3.10*	*3.35*
Jap., funnel....	*2.00*	*2.15*	*2.40*	*2.60*

Masons' Etc.

Cleveland Wire Spring Co.:
Steel Brick, No. 162.....each $1.05
Steel Mortar, No. 158.....each $1.35

Hoes— Eye—

Scovil and Oval Pattern. 60&10@60&10&10%
Grub, list Feb. 23, 1899. 70&10@70&10&10%
D. & H. Scovil.....27½%

Handled—

Cronk's Weeding, No. 1, $2.00; No. 2, $2.50
Star Double Bit.....$2.50

Holders— Bit—

Angular, ₱ doz. $24.00.....45&10%

Broom—

Pullman Broom, ₱ gro.....$9.00

Door—

Bardsley's, Iron, 40%; Bronze.....20%
Empire 50%
Pullman 25%
Richards Mfg. Co.: No. 117, Ever-ready, 40%; Nos. 118, 119, Sure Grip 50%
Superior 40%

File and Tool—

Nicholson File Holders and File Handles .....33⅓@40%

Fruit Jar—

Triumph Fruit Jar Holder, ₱ doz. $2.00

Nipple—

Curtis Nipple Holders.....5%

Trace and Rein—

Fernald Double Trace Holder, ₱ doz. pairs $1.25
Dash Rein Holder, ₱ doz.....$1.25

Hones—Razor—

Pike Mfg. Co., Belgian and Swaty, 50%; German.....33⅓%

Hooks—Cast—

Bird Cage, Reading.....50%
Clothes Line, Reading List.....50&5%
Coat and Hat Iron, Reading.....50%
Coat and Hat, Bronze Metal, Reading 33⅓%
Coat and Hat, Wrightsville.....60&5%
Harness, Reading List.....50%

Wire—

Belt, Nos. 1 to 15...80&5@80&10%
Wire C. & H. Hooks..80@80&10%
Parker Wire Goods Co., King..75&10%
Wire Goods Co.:
Acme, 60&10%; Chief, 75@75&10%; Crown, 75&10@80%; Czar, 70%; Capitol 80%; Czar Harness, 50&10%; Ceiling, 75@80%.

Miscellaneous—

Hooks, Bench, see *Stops, Bench.*
Bush, Light, doz., $6.20; Medium, $6.75; Heavy, $7.65
Grass, best, all sizes, per doz., $2.75@$3.00
Grass, common grades, all sizes, per doz.....$1.25@$1.50
Hooks and Eyes:
Brass .....60@60&10%
Malleable Iron.....70@70&10%
Covert Mfg. Co. Gate and Scuttle Hooks 25%
Turner & Stanton Co. Cup and Shoulder .....85&10%
Bench Hooks—See Bench Stops.
Corn Hooks—See Knives, Corn.

Hose, Rubber—

Garden Hose, ¾-inch:
Competition .....ft. 6@6½¢
3-ply Guaranteed.....ft. 8@8½¢
4-ply Guaranteed.....ft. 9½@10¢
Cotton Garden, ¾-in., coupled:
Low Grade.....ft. 8@9¢
Fair Quality.....ft. 10@11¢

Irons— Sad—

From ¼ to 10.....lb. 3@3½¢
Mrs. Potts', cents per set:

	Nos. 50	55	60	65
Jap'd Caps	*.86*	*93*	*95*	*93*
Tin'd Caps	*.91*	*88*	*1.01*	*98*

Bar and Corner—

Richards Mfg. Co., Bar, 60&10%; Corner 60%

Jacks, Wagons—

Covert Mfg. Co.:
Auto Screw.....30&10%; Steel, 50%
Lane's Steel.....30&5%
Richards' Tiger Steel, No. 130...50&10%

Ladder—

Richards Mfg. Co., Ladder Jacks..50%

Jointers—

Pike Mfg. Co., Saw Jointers, $7.00..40%

Knives—

Butcher, Kitchen, &c.—

Foster Bros.' Butcher, &c.....30%

Corn—

Columbian Cutlery Co., Wilcut Brand Knives and Hooks.....60%

Drawing—

Standard List.....80@—%
C. E. Jennings & Co., Nos. 45, 46, 25&7½%
Jennings & Griffin, Nos. 41, 42, 66⅔&7½%
Swan's .....66⅔@70%
L. & I. J. White.....20&5@25%

Hay and Straw—

Serrated Edge, per doz. $5.00@5.50
Iwan's Sickle Edge.....₱ doz. $8.00
Iwan's Serrated.....₱ doz. $9.50

Miscellaneous—

Farriers' .....doz. $2.40@$2.80

Knobs—

Base, 2½-inch, Birch or Maple, Rubber Tip.....gro. $1.25@1.40
Door, Mineral.....doz. 65@70¢
Door, Por. Jap'd.....doz. 70@75c
Door, Por. Nickel..doz. $2.05@2.15
Bardsley's Wood Door and Shutters.10%

Ladders, Store, &c.—

Lane's Store.....25%
Myers' Noiseless Store Ladders....50%
Richards Mfg. Co.:
Improved Noiseless, No. 112.....50%
Climax Shelf, No. 113.....50%
Trolley, No. 109.....50%

Ladles, Melting—

L. & G. Mfg. Co.'s list, Melting and Plumbers' 25%
P., S. & W.....40&10%
Reading .....50&10%

Lamps,—

Hammer's M. I. Hand.....40%

Lanterns—Tubular—

Regular, No. 0....doz. $4.00@4.50
Side Lift, No. 0....doz. $4.25@4.75
Hinge Globe, No. 0. doz. $4.25@4.75
Other Styles.....40&5%

Bull's Eye Police—

3-inch .....$3.75@4.00

Latches— Thumb—

Roggin's Latches, Jap'd, with Screws .....doz. 40¢

Door—

Cronk & Carrier Mfg. Co., No. 101, ₱ doz. $2.00
Richards' Bull Dog, Heavy, No. 125 .....50&5%
Richards' Trump, No. 127.....$1.50

Leaders, Cattle—

Small.....doz. 45¢; large, 55¢
Covert Mfg. Co.: Cotton, 55%; Hemp, 45%; Jute, 55%; Sisal, 45%.

Lifters, Transom—

Reading, Iron, 50&5%; Bronze Metal 33⅓%
R. & E.....10%

Lines—

Wire Clothes, Nos.	*18*	*19*	*20*
100 feet	*$2.30*	*1.95*	*1.75*
75 feet	*1.95*	*1.65*	*1.50*

Chalk Lines, Cotton, ½-lb. Balls, per lb.....25@30¢
Mason Lines, Linen, ½-lb. Balls, per lb.....47¢
Samson Cordage Works:
Solid Braided Chalk, Nos. 0 to 3..40%
Solid Braided Masons'.....30%
Silver Lake Braided Chalk, No. 0, $6.00; No. 1, $6.50; No. 2, $7.00; No. 3, $7.50.....₱ gr. 30%
Masons' Lines, Shade Cord, &c.:
White Cotton, No. 3½, $1.50; No. 4, $2.00; No. 4½, $2.50; Colors, No. 3½, $1.75; No. 4, $2.25; No. 4½, $2.75; Linen, No. 3½, $2.50; No. 4, $3.50; No. 4½, $4.50.....30%
Tent and Awning Lines: No. 5, White Cotton, $7.50; Drab Cotton, $8.50 .....20%
Clothes Lines, White Cotton: 50 ft., $2.75; 60 ft., $3.25; 70 ft., $3.75; 75 ft., $4.00; 80 ft., $4.25; 90 ft., $4.75; 100 ft., $5.25.....30%
Turner & Stanton Co.:
Solid Braided Chalk, Masons' and Awning Lines.....40%
Clothes Lines, White Cotton.....40%
Shade Cord, Cotton or Linen....30%

Locks— Cabinet—

Cabinet Locks....33⅓@33⅓@3%

Door Locks, Latches, &c.—

NOTE.—Net Prices are very often made on these goods.
Reading Hardware Co.....33⅓
R. & E. Mfg. Co.....10%

Padlocks—

R. & E. Mfg. Co, Wrought Steel and Brass .....75&10%

Sash, &c.—

Ives' Patent:
Crescent 25%
Automatic Gravity Metal Sash, ₱ gro. $149.58.....25%
Window Ventilating.....25%
Pullman Patent Ventilating Lock..25%
Reading Sash Locks, Iron.....50%
Reading Sash Locks, Bronze Metal, 33⅓%

Machines—Boring—

Com. Upr't, without Augers, $2.00@2.25
Com. Angl'r, without Augers, $2.25@2.50
Ford Auger Bit Co.....$22.00
Jennings', Nos. 1 and 4.....25&7½%
Millers' Falls.....5.75
Snell's, Upright, $2.65; Angular, $2.90
Swan's Improved.....40&10%

Corking—

Reisinger Invincible Hand Power... ₱ doz. $48.00

Forming, Bending, Etc—

Royal Forming, Bending, Crimping and Fluting, Hand Power, each, $20.00.....40%

Hoisting—

Moore's Anti-Friction Chain Hoist.30%
Moore's Hand Hoist, with Lock Brake 20%
Moore's Cyclone High Speed Chain Hoist 25%

Ice Cutting—

Chandler's 12½%

Mallets—

Hickory .....45&5@50%
Lignumvitæ .....45&5@50%
Tinners' Hickory and Applewood .....doz. 45&5@50%

Mangers, Stable—

Swett Iron Works.....50%

Mats, Door—

Acme Flexible Steel.....50%
Elastic Steel (W. G. Co.), new list.50%
Everlasting Flexible Steel.....40%

Mills, Coffee, &c.—

Enterprise Mfg. Co.:
Coffee .....20@25%
Bone, Shell and Corn.....25&10%
Parker's Columbia and Victoria..33⅓%
Parker's Box and Side.....50&10%
Swift, Lane Bros. Co.....30%

Motors, Water—

Pike Mfg. Co., Tool and Knife Grinding 33⅓%

Mowers, Lawn—

NOTE.—Net prices are generally quoted
Cheapest, 10-in., $1.80; advance 10¢ for each size.
Cheap, 10-in., $2.50; advance, 10¢ for each size.
Better Grade, 10-in., $3.25; advance 25¢ for each size.

	12	*14*	*16*	*18 in.*
High Grade	*$4.50*	*4.75*	*5.00*	*5.25*

Continental, High and Low Wheel, 50&10%
Great American.....66⅔%
Great American Ball Bearing....66⅔%
Quaker City.....66⅔%
Pennsylvania, High and Low Wheel, 50&10%
Pennsylvania, Jr., Ball Bearing 50&5%
Pennsylvania Golf, 6 Knives, Low Wheel, 33⅓%; High Wheel.....45%
Pennsylvania Golf, Ball Bearing 7 Knives, High Wheel.....33⅓%
Pennsylvania Horse, 30 and 38 inch, 33⅓&5%
Pennsylvania Pony or Two Man.40&5%
Pennsylvania Grand Horse, 30 and 38 in.....33⅓%

Nails—

Wire Nails and Brads, Miscellaneous .....85&10%
Cut and Wire. See *Trade Report.*
Hungarian, Finishing, Upholsterers', &c. See *Tacks.*

Horse—

Jobbers' Special Brands, per lb. 9¢

Picture—

	1½	*2*	*2½*	*3 in.*
Brass Hd. gro.	*.45*	*.55*	*.60*	*.70*
Por. Head, gro., all sizes				*.80¢*

Upholsters—

Brass 30%
Plated .....30&10%

Nuts— *Blank or Tapped.*

Cold Punched:	*Off list.*
Square	*5.10¢*
Hexagon	*5.70¢*
Square, C., T. & R.	*5.50¢*
Hexagon, C., T. & R.	*6.30¢*
Hot Pressed:	*Off list.*
Square	*5.50@5.60¢*
Hexagon	*5.90@6.00¢*

Oakum—

Best .....lb. 6½¢
U. S. Navy.....lb. 6 ¢
Navy .....lb. 5 ¢
Plumbers' Spun Oakum..2¾@3 ¢

Oil—

Pike Mfg. Co., Stonoil.....40%

Oil Tanks—See *Tanks, Oil.*

Oilers—

Steel, Copper Plated.....75&10%
Chase or Paragon:
Brass and Copper.....45&50%
Zinc .....65&10@70%
Railroad .....60&10&10%
American Tube & Stamping Co.:
Spring Bottom Cans.....70@70&10%
Railroad Oilers, &c.....60@60&10%
Hero Fruit Jar Co.:
Spring Bottom Cans.....70@70&10%
Railroad Oilers, etc.....60@60&10%
Malleable, Hammers' Improved, Nos. 11, 12 and 13, 10%; Old Pattern, Nos. 1, 2, 3, 4, 50%.
Maple City Mfg. Co.:
Spring Bottom Cans.....70@70&10%
Railroad Oilers, &c.....60@60&10%

Openers, Can—

Triumph Shear Can Openers, doz..$1.20

Egg—

Harrigan Nickel Plate, ₱ doz., $2.00; Silver Plate, $4.00.

Packing—

Asbestos Packing, Wick and Rope, any quantity.....13¢

Rubber—

(Fair quality goods.)
Sheet, C. I.....11@12¢
Sheet, C. O. S.....11@12¢
Sheet, C. B. S.....12@13¢
Sheet, Pure Gum.....40@45¢
Sheet, Red.....40@50¢
Jenkins' '96, ₱ lb, 80¢.....25%

Miscellaneous—

American Packing....lb. 7@10 ¢
Cotton Packing.....lb. 16@25 c
Italian Packing.....lb. 9@10¢
Jute .....lb. 4@4½¢
Russia Packing.....lb. 9@10¢

Pails, Galvanized—

Net, per dozen.

Quarts..	*8*	*10*	*12*	*14*	*16*
Light	*$1.45*	*1.65*	*1.80*	*2.00*	*2.35*
Ex. heavy.	*...*	*$2.65*	*2.85*	*3.00*	*3.35*

Rd. Bottom

Fire Pails	*1.95*	*2.10*	*2.30*	...	...
Well Pails	*1.95*	*2.15*	*2.35*	...	...

Paint—

Dixon's Silica-Graphite, in 1 gal. pails and 5 gal. kegs, 25%; packages of larger size.....20%

Pans— Dripping—

Standard List.....75&10&5%

Refrigerator, Galva.—

Inch	*12*	*14*	*16*	*18*
Per doz.	*$2.00*	*2.25*	*2.50*	*2.75*

Paper—Building Paper

Per roll.
Rosin Sized Sheathing: 500 sq. ft. Light weight, 25 lbs. to roll..38¢
Medium weight, 30 lbs. to roll. 45¢
Heavy weight, 40 lbs. to roll..60¢
Black Water Proof Sheathing, 500 sq. ft., light weight, 65¢; medium weight, 95¢; heavy weight, $1.30.
Deafening Felt, 9 and 6 sq. ft. to lb., ton.....$40.00
Red Rope Roofing, 250 sq. ft. per roll.....$1.75

Tarred Paper—

1 ply (roll 400 sq. ft.), ton, carloads, $31.00; less than carloads $32.00
2 ply, (roll 108 sq. ft.), 40 lb..48¢
3 ply (roll 108 sq. ft.), 60 lb..68¢
Slater's Felt (roll 500 sq. ft.), per ton, $35.00; per roll.....70¢

Sand Paper and Cloth—

Flint and Emery.....50&10%
Garnet Paper and Cloth.....25%

Parers—Apple—

Goodell Co.:
Family Bay State.....₱ doz. $15.00
Improved Bay State.....₱ doz. $36.00
New Lightning.....₱ doz. $7.00
Turn Table '98.....₱ doz. $6.00
White Mountain.....₱ doz. $5.00
Bonanza Improved.....each $7.50
Dandy .....each $10.00
New Century.....each $20.00
Ranger .....each $25.00
Rapid Apple Slicer.....each $100.00
Reading Hardware Co.:
Advance .....₱ doz. $4.00
Baldwin .....₱ doz. $4.00
Reading 72.....₱ doz. $3.25
Reading 78.....₱ doz. $6.25

Orange—

Goodell Co., Success.....each $20.00

Potato—

Saratoga .....₱ doz. $7.00
White Mountain.....₱ doz. $6.00

Picks and Mattocks—

List 75%
Cronk's Handled Garden Mattock, ₱ doz., $6.00 ..... 33⅓%

Pins, Escutcheon—

Brass ..... 50@50&10%
Iron ..... 60@60&10%

Pipe, Cast Iron Soil—

Eastern Prices:
Standard, 2-6 in. 68%
Extra Heavy, 2-6 in. 74%
Fittings, Standard and Heavy 80¾%
Extra, 10 & 10&5%

Pipe, Merchant—

	Carloads to Consumers: Steel. Blk. %	Iron. Galv. %	Blk. %	Galv. %
⅛ and ¼ in.				
⅜ in.				
½ in.				
¾ to 6 in.				
7 to 12 in.				

See Trade Report

Pipe, Vitrified Sewer—

Carload lots.
Standard Pipe and Fittings, 3 to 24 in., f.o.b. factory:
First class 85%
Second-class 87%

Pipe, Stove—

	Per 100 joints. C. L.	L. C. L.
Wheeling Corrugating Co.'s Nested		
5 in., Uniform Color	$5.90	$6.90
6 in., Uniform Color	6.40	7.40
7 in., Uniform Color	7.40	8.40

Planes and Plane Irons—

Wood Planes—

Bench, first qual. ..... 30@30&5%
Bench, second qual. ..... 40@40&5%
Molding ..... 25@25&5%
Chapin-Stephens Co.:
Bench, First Quality 30%
Bench, Second Quality 40%
Molding and Miscellaneous 25%
Toy and German 30%
Union 60%

Iron Planes—

Union 60%

Plane Irons—

Wood Bench Plane Irons 25%
Buck Bros. 30%
Chapin-Stephens Co. 25%
Union 50%
L. & I. J. White ..... 20&5@25%

Planters, Corn, Hand—

Kohler's Eclipse ..... ₱ doz. $7.50

Plates—

Felloe ..... lb. 3¾@4¢
Avery Stamping Co.:
Standard Wrot, Steel Felloe Plates in 100 lb kegs, per 100 lb, ¾-in. to 1¼-in., $4.00 net; 1¼-in. to 2-in., inclusive, $3.75 net.

Steel Pipe Hook—

Never-Break ..... 75&10%

Pliers and Nippers—

Button Pliers ..... 75&5@75&10%
Gas Burner, per doz., 5 in., $1.25 @$1.50; 6 in., $1.45, $1.50.
Gas pipe.. 7 $2.00, 8 $2.25, 10 $2.75, 12-in. $3.50
Acme Nippers 50%
Cronk & Carrier Mfg. Co.:
American Button 80%
Improved Button ..... 75&10%
Cronk's 60%
No. 80 Linemen's 50%
Stub's Pattern 45%
Combination and others 33⅓%
Elmore Tool Mfg. Co.:
Gas Pliers 70%
Wire and Cutting Pliers 75%
Heller's Farriers' Nippers, Pincers and Tools ..... 40@10&10%
P., S. & W. Tinners' Cutting Nippers 20%
Utica Drop Forge & Tool Co.:
Pliers and Nippers, all kinds 40%

Plumbs and Levels—

Chapin-Stephens Co.:
Plumbs and Levels ..... 30@30&10%
Chapin's Imp. Brass Cor. ..... 40@40&10%
Pocket Levels ..... 30@30&10%
Extension Sights ..... 30@30&10%
Machinists' Levels ..... 40@40&10%
Disston & Sons:
Shafting Levels ..... 60&10%
Pocket Levels ..... 60&10%
Plumbs and Levels ..... 60&10%
Track Level and Gauge ..... 60&10%

Points, Glaziers'—

Bulk and 1-lb. papers ..... lb. 10¢
½-lb. papers ..... lb. 11¢
¼-lb. papers ..... lb. 12¢

Police Goods—

Manufacturers' Lists ..... 25@25&5%

Polish—Metal, Etc—

Ladd Co.:
Putzade Liquid, ₱ gro., ½ pts., $12.00; 1 pts., $20.00; 1 qts., $40.00; ₱ doz., ¼ gals., $6.35; 1 gals., $12.00.
Prestoline Liquid, No. 1 (¼ pt.), ₱ doz., $3.00; No. 2 (1 qu.), $9.00 ..... 10%
Prestoline Paste 10%
George William Hoffman:
U. S. Metal Polish Paste, 3 oz. boxes, ₱ doz., 50¢; ₱ gro., $4.50; ½ lb boxes, ₱ doz., $1.25; 1 lb boxes, ₱ doz. $2.25.
U. S. Liquid, 8 oz. cans, ₱ doz., $1.25.
Barkeepers' Friend Metal Polish, ₱ doz., $1.75.

Stove—

Black Eagle Benzine Paste, 5 lb cans, ₱ lb 10¢
Black Eagle, Liquid, ½ pt. cans, ₱ doz. 75¢
Black Jack Paste, ¾ lb cans, ₱ gr. $9.00
Black Kid Paste, 5 lb can...each, $0.65
Ladd's Black Beauty Liquid, per 100 tins $6.75
Joseph Dixon, ₱ gr. $5.75 ..... 10%
Dixon's Plumbago ..... ₱ lb 8¢
Fireside ..... ₱ gr. $2.50
Gem, ₱ gr. $1.50 ..... 10%
Japanese ..... ₱ gr. $3.50
Jet Black ..... ₱ gr. $3.50
Peerless Iron Enamel, 10 oz. cans.. ₱ doz. $1.50

Window Polish—

Benj. P. Forbes:
Glasbright, 1 lb cans, each ..... 75¢
Glasbright, Factory, 10 lb pails, ₱ lb ..... 25¢

Poppers, Corn—

1 qt. Square..doz. $0.75; gro. $8.75
1 qt. Round..doz. $0.90; gro. $10.00
1½ qt. Square. doz. $1.20; gro. $12.00
2 qt. Square..doz. $1.50; gro. $15.00

Pots, Glue—

Enameled ..... 30&10%
Tinned ..... 30&5%

Powder—

Black Sporting:
Kegs (25 lb.)..$5.00@5.50
Half Kegs (12½ lb.), $2.75@3.00
Quarter Kegs (6¼ lb.), $1.50@1.65
Canisters, pounds... .25
Canisters, ½ pounds. .15
Canisters, ¼ pounds. .12
Discount to the trade, 10%.
NOTE.—Prices vary according to territory.

Presses—

Enterprise Mfg. Co., Fruit, Wine and Jelly ..... 20@25%
Lard Presses and Sausage Stuffers ..... 25@25&7½%

Seal Presses—

Morrill's No. 1, ₱ doz., $20.00 ..... 50%
Morrill's Pocket, $20.00 ..... 50%

Pruning Hooks and Shears

See *Shears.*

Pullers, Nail, Etc.—

Elmore Tool Mfg. Co.:
Drop Forged Tack Claws ..... 50&10%
Standard Tack Claws, No. 10 ..... 33⅓&7½%
Nail Pullers 40%
Miller's Falls, No. 3, ₱ doz., $12.00 ..... 33⅓&10%
Morrill's No. 1, Nail Puller, ₱ doz. $20.00 ..... 50%
Pearson Spike Puller, each, $15.00 ..... 25%
Parrot Tack and Stub Pullers, ₱ doz. $1.20
The Scranton Co. Case Lots:
No. 2B (large) $5.50
No. 3B (small) $5.00

Pulleys, Single Wheel—

Inch	1½	1¾	2	3
Awning or Tackle, doz.	$0.30	.45	.60	1.05
Hay Fork, Swivel or Solid Eye, doz., ½ in., $1.25; 5 in., $1.55				
Inch	2	2¼	2½	
Hot House, doz...	$0.65	.85	1.20	
Inch	1¼	1½	1¾	2
Screw, doz....	$0.16	.19	.23	.30
Inch	1¾	2	2¼	2½
Side, doz.....	$0.25	.40	.55	.60
Inch	1½	1¾	2	2½

Sash Pulleys—

Common Frame; Square or Round End, per doz., 1¾ and 2 in. ..... *17@20¢*
Auger Mortise, no Face Plate, per doz., 1¾ and 2 in.. ..... *20@21¢*
Acme, No. 35...1¾ in., 19¢; 2 in., 20½¢
American Pulley Co.:
Wrought Steel American Plain Axle ..... 50&10%
Wrought Steel, Eagle, ₱ doz., 1¾ in., 17¢; 2 in., 20¢; 2¼ in. ..... 27¢
Top Notch, Electrically Welded Nos. 3 and 4, ₱ doz. ..... 19¢
Common Sense ..... ₱ doz. 20¢
Merit, ₱ doz., 2¼ in. ..... 37¢
Fox-All-Steel, Nos. 3 and 7, 2 in.... ₱ doz. 50%
Grand Rapids All Steel Noiseless.. 50%
Niagara, No. 25, 1¾ in., 19¢; 2 in. ..... 20½¢
No. 26 Trov..1¾ in., 14½¢; 2 in., 16½¢
Star, No. 26....1¾ in., 19¢; 2 in., 20½¢
Tackle Blocks—See Blocks.

Pumps—

Cistern 60%
Pitcher Spout ..... 75&10&5@80
Wood Pumps, Tubing, &s 50%
Barnes Mfg. Co.:
Dbl. Acting (low list) 50%
Pitcher Spout 80%
Daisy Spray Pump ..... ₱ doz. $6.50
Goulds Mfg. Co.:
Double-Acting Thresher Tank.. $5.00
Diaphragm No. 3, Side Suction. $11.50
Empire, Advance, Seneca, D, A, Shallow and Deep Well (low list) 50%
Spraying and Whitewashing $2.45
F. E. Myers & Bros. (low lists):
Double Acting Force and Lift; Cistern and Well; House; Windmill; Ratchet Handle; Pump Stands; Hydro-Pneumatic; Bulldozer Power; Spray; Ashland Force and Lift 50%
Thresher Tank—Myers and Faultless Low Down Tank $5.90
Century Low Down Tank, No. 470 ..... $5.25
Century Low Down Ratchet Handle Tank, No. R470 ..... $5.50

Pump Attachments—

Chicago Hdw. & Fdy. Pump Spout Attachments, each $0.27

Pump Leathers—

Plunger and Valve Leathers—Per gro.:

No.....	*1*	*2*	*3*	*4*
	$5.00	*6.00*	*7.00*	*8.00*

Cup Leathers—Per 100:

Inch....	*2½*	*3*	*3½*	*4*
	$5.00	*7.00*	*9.00*	*12.00*

30@30&5%

Punches—

Saddlers' or Drive, good, doz. 60@75¢
Spring, single tube, good quality *$1.75*
Revolving (4 tubes)....doz. $3.50
Bemis & Call Co.'s Cast St'l Drive. 50%
Elmore Tool Mfg. Co.:
Machinists' Center 40%
Tinners': Solid, 50%; Prick 50%
Morrill's Nos. 1AA, 1A, 1B, 1C, 1D, $15.00 ..... 50%
Hercules, 1 die, each $5.00 ..... 50%
Niagara Hollow Punches 40%
Niagara Solid Punches 55%
Tinners' Hollow, P., S. & W. Co.. 25%
Tinners' Solid, P., S. & W. Co., ₱ doz., $1.44 ..... 40&10%

Rail—Barn Door, &c.—

Sliding Door, Painted Iron, 2½@2¾¢
Sliding Door, Wrought Brass, 1⅛ in., lb., 36¢ 30%
Cronk's:
Double Braced Steel Rail..₱ ft. 2¾¢
O. N. T. Rail ..... 2½¢
Griffin's:
xxx, ₱ 100 ft., 1 x 3-16 in., $3.25; 1¼ x 3-16 in., $3.75.
Hinged Hanger, ₱ 100 ft., 1 x 3-16 in., $3.50; 1¼ x 3-16 in., $4.00.
Lane's:
Hinged Track, ₱ 100 ft. $3.45
O. N. T., ₱ 100 ft., 1 in., $3.12½; 1¼ in., $3.45; 1½ in., $4.00.
Standard, 1¼ in. ..... ₱ 100 ft. $4.00
Lawrence Bros.:
1 x 3-16 in., ₱ 100 ft., $7.50; 1¼ x 3-16 in., $8.75 ..... 55&7½%
Trolley, No. 301, ₱ ft. ..... 9¢
McKinney's:
Hinged Hanger Track, ₱ ft., 11¢ ..... 60&5%
1 x 3-16 Track ..... 55&7½%
Myers' Stayon Track ..... 60&10%
Richards Mfg. Co.:
Common, 1 x 3-16 in., $3.00; 1¼ x 3-16, $3.25; 1¼ x 3-16, $3.50.
Special Hinged Hanger Rail..60&10%
Lag Screw Rail, No. 65 ..... 50%
Gauge Trolley Track, ₱ ft., No. 31, 9¢; No. 32, 14¢; No. 33, 20¢.
No. 50 ..... 60&10%
Nos. 61, $3.00; 62, $3.25; 63, $3.50; 64, $4.00; 45, $3.25; 46, $3.50; 49, No. 1, $3.25; 49, No. 2, $3.50.

Rakes—

Cronk's:
Steel Garden: Champion, ₱ doz., 12-tooth, $3.75; 14-tooth, $4.00; 16-tooth, $4.25; Ideal, ₱ doz., 12-tooth, $3.00; 14-tooth, $3.30; 16-tooth, $3.60.
Victor, 12-tooth, $2.25; 14-tooth, $2.50; 16-tooth, $2.75.
Queen City Lawn, ₱ doz., 20 teeth, $2.35; 24, $2.50 ..... net
Anticlog Lawn, ₱ doz. $3.50
Malleable Garden ..... 70&10%
Ideal Steel Garden, ₱ doz., 12 teeth, $15.00; 14, $16.00; 16, $18.00 ..... 80%
Kohler's:
Jumbo Lawn, 36-tooth.... ₱ doz. $5.00
Lawn Queen, 20-tooth.... ₱ doz. $2.65
Lawn Queen, 24-tooth.... ₱ doz. $2.75
Paragon, 20-tooth ..... ₱ doz. $2.40
Paragon, 24-tooth ..... ₱ doz. $2.50
Steel Garden, 14-tooth.... ₱ doz. $2.40
Malleable Garden, 14-tooth, ₱ doz. $1.75@2.00

Rasps, Horse—

Disston's 75%
Heller Bros.' ..... 70&5@70&10&5%
Liveright Bros.' Gold Medal 70%
McCaffrey's American Standard ..... 60&10&5%
New Nicholson ..... 70&10@75%
See also Files.

Razors—

W. H. Compton Shear Co. 30%

Reels, Fishing—

Hendryx:
M 6, Q 6, A 6, B 6, M 9¾, M 16, Q 16, A 16, B 16, 4008, Rubber, Populo., Nickeled Populo 20%
Aluminum, German Silv., Bronze. 25%
1210 N, 124 N 20%
3004 N, 06 N, 6 RM, G 9 ..... 25%
4 N, 6 PN, 24 N, 26 PN 20%
2904 P., 33⅓%; 2701 PN., 33⅓%; 0924 N., 33⅓%; 02084 N., 33⅓%; 002904 PN., 33⅓%; 802 N., 33⅓%; 986 PN, 2904 N, 974 PN 25%
5009 PN, 5009 N 20%
Competitor, 102 P, 102 PN, 202 P, 202 PN, 102 PR, 202 PR 20%
304 P, 304 PN, 00304 P, 00304 PN. 33⅓%

Registers—

Japanned, Electroplated and Bronzed 70%
White Porcelain Enamel..50&10%
Solid Brass or Bronze Metal. 40%

Revolvers—

Single Action ..... *$5¢@$10.00*
Double Action, except 44 cal. $2.00
Double Action, 44 caliber... $2.00
Automatic *$4.00*
Hammerless *$4.50*

Riddles, Hardware Grade

	8	2½	3 inch.
16 in.....per doz.	*$2.50*	*@$2.75*	
17 in.....per doz.	*$2.75*	*@$3.00*	
18 in.....per doz.	*$3.00*	*@$3.25*	

Rings and Ringers—

Bull Rings—

	8	2½	3 inch.
Steel	*$0.70*	*0.75*	*0.80 doz.*
Copper	*$1.10*	*1.25*	*1.65 doz.*

Hog Rings and Ringers—

Hill's Rings, per gro. boxes, $4.60@$4.75; per doz. boxes, 40@45¢
Hill's Ringers, Gray Iron, doz., 55@65¢
Hill's Ringers, Malleable Iron, doz. 85@95¢
Blair's Rings..per gro. $5.50@$6.00
Blair's Ringers..per doz. 65@70¢

Rivets—

Copper Rivets and Burrs, 50@50&10%
Tinners' and Miscellaneous Rivets 80%
Structural, base ..... 2.15¢
Boiler, base ..... 2.25¢

Bifurcated and Tubular—

Assorted in Pasteboard Boxes.
Bifurcated, per dozen boxes, 50 count, 40@45¢; 100 count, 50@63¢.
Tubular, per doz. boxes, 50 count, 60@68¢; 100 count, $1.12@$1.26.

Rollers—

Cronk's Stay, No. 50 ..... $1.00
Cronk's Brinkerhoff No. 55, $0.60; No. 56, $0.75; No. 60 ..... $0.75
Lane's Stay 40%
Myers' Stay 60%
Richards' Stay:
Handy Adj. and Reversible No. 53. 75¢
O. K. Adj. and Reversible No. 58. 50¢
Lag Screw, Nos. 55 and 57 ..... 50%
Underwriters', Nos. 59, 60 ..... 50%
Favorite, No. 54 ..... 60%

Rope—

Manila, 7-16 in. diam. and larger:
Highest Grade ..... *lb. 8@8¼¢*
Lower Grades ..... *lb. 7¼@7¾¢*
Sisal, 7-16 in. diam. and larger:
Highest Grade ..... *lb. 7½@7¾¢*
Commercial Grade. lb. 6¼@6½¢
Sisal, Hay, Hide and Bale Ropes, Medium and Coarse:
Pure ..... *lb. 7¾@8¢*
Sisal, Tarred, Medium Lath Yarn:
Pure ..... *lb. 6¾@7¢*
Cotton Rope:
Best, ¼-in. and larger..18@22¢
Medium, ¼-in. and larger. 16¼¢
Common, ¼-in. and larger...8¢
In coils, ½¢ advance.
Jute Rope:
Rove, No. 1, ¼-in. and up. lb. ..... *5@5½¢*

Wire Rope—

Galvanized ..... *57½&2½%*
Plain ..... *55&2½%*

Ropes, Hammock—

Covert Mfg. Co.:
Jute, $0.75@$0.83; Sisal....$0.82@$0.90

Rules

Boxwood .....60&5%
Ivory .....25&5%

Chapin-Stephens Co.:
Boxwood 60%
Flexifold 40%
Ivory .....25@25&10%
Miscellaneous .....50@50&10%
Stephens' Combination 55%
Stationers' .....50@50&10%

Kenffel & Esser Co.:
Folding, Wood .....35&10%
Folding, Steel .....33⅓&10%

Lufkin's Steel .....50&10%
Lufkin's Lumber .....50&10%
Upson Nut Co.:
Upson Nut Co., Boxwood .....60&5%

Saws—

Atkins':
Circular 45%
Band .....50@50&10%
Butcher Saws 50%
Cross Cuts 35%
One-Man Cross Cut 40%
Narrow Cross Cut 50%
Hand, Rip and Panel .....35&5%
Miter Box and Compass 40%
Mulay, Mill and Drag 45%
Wood Saws .....40&10%

Chapin-Stephens Co.:
Turning Saws and Frames .....30@30&10%

Disston's:
Circular, Solid and Ins'ted Tooth 50%
Band, 2 to 18 in. wide 60%
Band, ⅛ to 1¾ 60%
Crosscuts 45%
Narrow Crosscuts 50%
Mulay, Mill and Drag 40%
Framed Woodsaws 25%
Woodsaw Blades 25%
Woodsaw Rods, Tinned 15%
Hand Saws, Nos. 12, 99, 9, 16, d100, D8, 120, 76, 77, 8 .....25%
Hand Saws, Nos. 7, 107, 107½, 3, 1, 0, 00, Combination 30%
Compass, Key Hole, &c. 25%
Hand Ice Saws 45%
Butcher Saws and Blades 30%

C. E. Jennings & Co.'s:
Back Saws 16⅔%
Butcher Saws .....25&7½%
Compass and Key Hole Saws .....33⅓&7½%
Framed Wood Saws .....25&7½%
Hand Saws 12½%
Wood Saw Blades .....33⅓&7½%

Millers Falls:
Butcher Saws .....15&10%
Star Saw Blades .....15&10%

Massachusetts Saw Works:
Victor Kitchen Saws .....40&10&50%
Butcher Saws Blades .....35@40%

Peace & Richardson's Hand Saws 30%

Simonds':
Circular Saws 45%
Crescent Ground Cross Cut Saws 30%
One-Man Cross Cuts .....40&10%
Gang Mill, Mulay and Drag Saws 40%
Band Saws 50%
Back Saws .....25@25&7½%
Butcher Saws .....35@35&7½%
Hand Saws .....25@25&7½%
Hand Saws, Bay State Brand 45%
Compass, Key Hole, &c. .....25@25&7½%
Wood Saws .....40&7½%

Wheeler, Madden & Clemson Mfg. Co.'s Cross Cut Saws 50%

Hack Saw Blades and Frames—

Atkins' Hack Saw Blades A A A 40%
Disston's:
Concave Blades 25%
Chromol Blades 35%
Hack Saw Frames 30%

Simonds, 35%; Bay State, 40%; Culley 35%

C. E. Jennings & Co.'s:
Hack Saw Frames, Nos. 175, 180 .....40&7½%
Hack Saws, Nos. 175, 180, complete, 40&7½%

Goodell's Hack Saw Blades .....40&10%
Griffin's Hack Saw Frames .....35&5&10%
Griffin's Hack Saw Blades .....35&5&10%
Griffin Co. Hack Saw Blades 50%
Star Hack Saws and Blades .....15&10%
Sterling Hack Saw Blades .....30&10&5%
Sterling Hack Saw Frames .....30&10&10%
Sterling Power Hack Saw Machines, each, No. 1, $25.00; No. 2, $30.00 .....10%
Victor Hack Saw Blades 20%
Victor Hack Saw Frames 40%
Victor Hack Saw Machines, each $75.00

Scroll—

Barnes, No. 7, $15 .....25%
Barnes' Scroll Saw Blades 40%
Barnes' Velocipede Power Scroll Saw, without boring attachment, $18; with boring attachment, $20 .....20%
Lester, complete, $10.00 .....15&10%
Rogers, complete, $3.50 and $4.00 .....15&10%

Scales—

Union Platform, Plain .....$2.10@2.20
Union Platform, Stpd .....$2.20@2.30

Chatillon's:
Eureka 28%
Favorite 40%
Grocers' Trip Scales 50%

Reading Hardware Co. .....50&5%
The Standard Portables 40%
The Standard R. R. and Wag- .....

Scrapers—

Chapin-Stephens Co., Box .....30@30&10%
Richards Mfg. Co., Foot 60%

Screws—Bench and Hand

Bench, Iron, doz., 1 in., $2.50@2.75; 1⅛, $3.00@3.25; 1¼, $3.50@3.75
Bench, Wood .....20@20&10%
Hand, Wood .....70&10@70&10&10%
Chapin-Stephens Co., Hand .....70@70&10&2½%

Coach, Lag and Hand Rail—

Lag, Cone Point .....75&10%
Coach, Gimlet Point .....75&5%
Hand Rail .....70&10@75%

Jack Screws—

Standard List .....70&10@75%
Millers Falls .....50&10&10%

Machine—

Cut Tread, Iron, Brass or Bronze:
Flat Head or Round Head, 50@50&10%
Fillister Head .....40@40&10%
Rolled Thread, F. H. or R. H., Iron .....75&10%
F. H. or R. H., Brass, Nos. 8 to 14 .....65&10%

Set and Cap—

Set (Iron) .....75&10&7½%
Set (Steel), net advance over Iron 25%
Sq. Hd. Cap .....70&10&7½%
Hex. Hd. Cap .....70&10&7½%
Rd. Hd. Cap .....50&7½%
Fillister Hd. Cap .....60&7½%

Wood—

List July 23, 1903.

Flat Head, Iron .....87½&5@..%
Round Head, Iron .....85&5@..%
Flat Head, Brass .....80&5@..%
Round Head, Brass .....77½&5@..%
Flat Head, Bronze .....75&5@..%
Round Head, Bronze .....72½&5@..%
Drive Screws .....87½&5@..%

Scythes—

Per doz.

Plain Grass, Cutting Edge Polished .....$6.25@$6.50
Clipper, Bronzed Web .....$6.50@$6.75
Solid Steel, Web and Backs Polished .....$7.00@$7.25
Bush, Weed and Bramble, Painted .....$6.50@$6.75
Grain, Painted, Cutting Edge Polished .....$8.25@$8.50
Clipper Grain, Bronze Web .....$8.50@$8.75

Seeders, Raisin—

Enterprise .....25@30%

Sets— Awl and Tool—

Fray's Hollow Tool Handles, Nos. 1, $12; 2, $16; 3, $12 .....50%
Millers Falls Adj. Tool Handles, No. 1, $12; No. 4, $12; No. 5, $18 .....20&10%

Sets, Nail—

Octagon .....*gro.* $3.50@3.75
Buck Bros. 27½%
Elmore Tool Mfg. Co. 30%
Mayhew's .....℔ gro. $3.00
Snell's Corrugated, Cup Pt. .....40&10%
Snell's Knurled, Cup Pt. .....40&10%
Victor Knurled, Cup Pt. .....℔ gro. $7.50

Rivet—

Regular list .....75@75&10%

Saw—

Atkin's:
Criterion 40%
Adjustable 40%

Disston's Star, Monarch and Triumph 30%
Giant Royal Cross Cut .....℔ doz. $6.00

Morrill's No. 1 .....$15.00
Nos. 3 and 4, Cross Cut $20.60
No. 5, Mill $30.00
Nos. 10, 11, 95 .....$15.60
No. 1 Old Style $10.00
Special $16.25
} 30

Royal, Hand .....℔ doz. $3.50
Seymour Smith & Son's 65%
Taintor Positive .....℔ doz. $6.75

Sharpeners, Knife—

Pike Mfg. Co.:
Fast Cut Pocket Knife Hones, ℔ doz. $1.50
Mounted Kitchen Sand Stone, ℔ doz. $1.50
Natural Grit Carving Knife Hones, ℔ doz. $3.00
Quick Cut Emery Carving Knife Hones, ℔ doz. $1.50
Quick Edge Pocket Knife Hones, ℔ doz. $2.50
} 25 50

Lawn Mower—

Pike Mfg. Co., 12, 14, 16, 18 and 20 in., doz., $6.00 .....33⅓%

Shavers, Beef—

Enterprise Mfg. Co. .....25@30%

Shaves, Spoke—

Iron .....*doz.* $1.25
Wood .....*doz.* $2.00

Chapin-Stephens Co. .....30@30&10%
Millers Falls Co., ℔ doz., $9.00 .....15&10%
Seymour Smith & Son's 30%

Shears—

Cast Iron	7	8	9 in.
Best	$16.00	18.00	20.00 gro.
Good	$13.00	15.00	17.00 gro.
Cheap	$5.00	6.00	7.00 gro.

Straight Trimmers, &c.:
Best quality Jap .....70&10&5%
Best Quality Nickel .....60&10&5%
Tailors' Shears .....40@40&10%
Acme Cast Shears 40%
Columbian Cutlery Co.:
Sheep, 1900 list .....30&10&5%
Grass .....50&10%
Horse or Mule .....50&10%
W. H. Compton Shear Co.:
Japan Handles, Nickel Blades, ...60&10&5%
Full Nickel .....50&10&5%
Tailors' 30%
J. Wiss & Sons Co.:
Best Quality Jap'd .....60&10%
Best Quality Nickeled .....50&10%
Tailors' 25%

Tinners' Snips—

Steel Blades .....20&5@20&10%
Steel Laid Blades .....50&10%
Acme Cast Snips 40%
W. H. Compton Shear Co., Forged Steel Handles 35%
Jennings & Griffin Mfg. Co.'s 6½ to 10 in. .....33⅓&7½%
Niagara Snips 40%
P. S. & W. Forged Handles 25%
Forged Handles, Steel Blades, Samson .....40@40&5%
Triumph Stove Pipe, doz. $6.00
J. Wiss & Sons Co.:
Wiss Forged Steel 25%

Pruning Shears—

Columbian Cutlery Co.:
Hedge, Wilcut Brand .....60&10%
Lawn and Border, Wilcut Brand, ...60&10%
W. H. Compton Shear Co., Dropped Forged Steel 35%
Cronk's Hand Shears 33⅓%
Cronk's Wood Handle Shears 33⅓%
Disston's Combined Pruning Hook and Saw, ℔ doz., $18.00 .....25%
Disston's Pruning Hook only, ℔ doz., $12.00 .....25%
J. T. Henry Mfg. Co.:
Pruning Shears, all grades 40%
P. S. & W. Co. 40%
Seymour Smith & Son's:
Hand Shears 70%
Standard Tree Pruners .....75&10%
Wood Handle Pruning Shears 40%

Sheaves—Sliding Door—

Reading 40%
R. & E. list 15%

Sliding Shutter—

Reading list 40%
R. & E. list 15%

Shells—Empty—

Brass Shells, Empty:
Climax, 10 and 12 gauge .....60&5%
Club, Rival, 65&5%; First Quality, ...60&5%

Paper Shells, Empty:
New Rapid, 10, 12, 16 and 20 gauge, ...10%
Climax, 10 and 12 gauge; Arrow, 10, 12, 16 and 20 gauge; Leader grade .....25&5%
New Club, 10 and 12 gauge, Rival Grade 15%
New Climax, Defiance, 10, 12, 14, 16 and 20 gauge; Climax, 14, 16 and 20 gauge 20%
Nitro Club, 10, 12, 16 and 20 gauge; New Club, 14, 16 and 20 gauge; Repeater Grade 20%

Shells, Loaded—

Loaded with Black Powder 40%
Loaded with Smokeless Powder, medium grade .....40&5%
Loaded with Smokeless Powder, high grade .....40&10&10%

Union Metallic Cartridge Co.:
New Club, Black Powders 40%
Nitro Club, Smokeless Powders .....40&5%
Arrow, Smokeless Powders .....40&10&10%
Winchester:
Smokeless Repeater Grade .....40&5%
Smokeless Leader Grade .....40&10&10%
Black Powder 40%

Shingles, Metal— Per Sq.

Wheeling Corrugating Co.:

Dixie, 14 x 20 in.	....	$4.05
Dixie, 10 x 14 in.	....	4.25
Dixie, 7 x 10 in.	....	5.25
		$5.05
		5.45
		6.70

Shoes, Horse, Mule, &c.—

F.o.b. Pittsburgh:
Iron .....*per keg* $4.10
Steel .....*per keg* $3.85
Burden's, all sizes .....℔ keg $3.90

Shot—

25-lb. bag.
Drop, up to B $1.70
Drop, B and larger 1.95
Buck 1.95
Chilled 1.85
Dust 2.30

Shovels and Spades—

Association List .....40&7½%@40&10%
Avery Stamping Co. 40%

Snow Shovels—

Long Handle .....$2.50@$2.75
Wood and Mall, D Handle .....$2.65@$2.90

Sieves and Sifters—

Hunter's Imitation, gro $9.50
Hunter's Genuine, per gro $12.00

Sieves, Seamless Metallic

Per dozen.

Mesh	1½	16	18	20
Iron Wire	$1.05	1.05	1.10	1.20
Tinned Wire	$1.15	1.15	1.20	1.30

Sieves, Wooden Rim—

Nested, 10, 11 and 12 Inch.
Mesh 18, Nested .....*doz.* $0.90@0.95
Mesh 20, Nested .....*doz.* $1.00@1.05
Mesh 24, Nested .....*doz.* $1.30@1.40

Sinks, Cast Iron—

Painted, Standard list:
12 x 12 to 22 x 36 in. 60%
20 x 24 to 24 x 50 in. 50%
24 x 60 to 24 x 120 in. 30%
Barnes' low list, all sizes up to 20 x 40, 60%; larger sizes 55%

NOTE.—There is not entire uniformity in lists used by jobbers.

Steel—

Steel Sinks, L. & G. list 60%

Skeins, Wagon—

Cast Iron .....70@70&10%
Steel .....35@40%

Slates, School—

Factory Shipments.
"D" Slates .....50&50&10%
Eureka, Unexcelled Noiseless .....60&7 tens.
Victor A, Noiseless .....60&7 tens &5%

Sleds—

Little Giant Folding, ℔ doz. $12.00

Snaps, Harness—

German .....40@40&10%
Covert Mfg. Co.:
Polo, King .....25&10%
High Grade, Covert, Trojan .....30&10&10%
Yankee, Queen, Yankee Roller .....30&10%

Snaths—

Grass Scythe .....50@50&5%

Spoons and Forks—

Silver Plated—

Good Quality .....50&10@60&5%
Cheap .....60@60&10%
International Silver Co:
1847 Rogers Bros. .....40&10%
Rogers & Bro., William Rogers' Eagle Brand .....50&10%
Anchor, Rogers Brand 60%
Wm. Rogers & Son .....60&10%

Miscellaneous

German Silver .....60@60&5%

Tinned Iron—

Teas .....*per gro.* 50@55¢
Tables .....*per gro.* $0.90@$1.00

Springs— Door—

Bardsley's Spring and Check 33⅓%
Chicago (Coil) .....40&10%
Pullman Door (Coil), ℔ gro. $10.00
Pullman Gate 10%
Reliance (Coil) .....40&10%

Carriage, Wagon, &c.—

1¼ in. and Wider: *Per 100 lb.*
Black .....$4.75@$5.00
Half Bright .....$4.75@$5.00
Bright .....$5.25@$5.50
Painted Seat Springs:
1½ x 2 x 26 .....*per pair* 45@47¢
1½ x 3 x 28 .....*per pair* 68@71¢

Sprinklers, Lawn—

Enterprise .....25@30%
Hero Fruit Jar Co., ℔ doz. $4.50
Philadelphia No. 1, ℔ doz., $12; No. 2, $15; No. 3, $20 .....30%

Squares—

Nickel plated } *New List, See*
Steel and Iron } *Trade Report.*
Rosewood Hdl. Try Square and T-Bevels .....60&10&10&70%
Iron Hdl. Try Squares and T-Bevels .....40&10@40&10&10%
Disston's Try Squares and Bevels, ...60&10%

Squeezers, Lemon

Wood, Porcelain Lined:
Cheap .....*doz.* $1.00
Good Grade .....*doz.* $1.25
Tinned Iron .....*doz.* $0.75@1.00
Iron, Porcelain Lined .....*doz.* $1.75
Victor, ℔ gro. $9.00

Staples—

Barbed Blind .....85&5@85&10%
Electricians' .....80&10&10@85%
Fence Staples, Polished, $1.80; Galvanized $2.10
Poultry Netting Staples .....*per lb.* 3¼@3½¢

Steels, Butchers'—

Dick's 30%
Foster Bros.' 30%

Steelyards— .....30@30&10%

Stocks and Dies—

Blacksmiths' .....50@50&10%
Curtis Rev'ble Ratchet Die Stock..25%
Derby Screw Plates.....25%
Green River.....25%
Lightning Screw Plate.....25%
Little Giant.....25%
Reece's New Screw Plate.....25%

Stoners, Cherry—

Enterprise .....25@30%

Stones, Axe—

Pike Mfg. Co., Axe Stones (all kinds) 33⅓%

Glass Cutters' Stones—

Pike Mfg. Co., Glass Cutters' Stones and Supplies.....40%

Stones, Oil, &c.—

Pike Mfg. Co., 1907 list: ℔ lb
Arkansas St. No. 1, 3 to 5½ in..$2.80
Arkansas St. No. 1, 5½ to 8 in..$3.50
Arkansas Slips No. 1.....$1.00
Lily White Washita, 4 to 8 in..60¢
Rosy Red Washita, 4 to 8 in..60¢
Washita St., Extra, 4 to 8 in..50¢
Washita St., No. 1, 4 to 8 in..40¢
Washita St., No. 2, 4 to 8 in..25¢
Lily White Slips.....80¢
Rosy Red Slips.....80¢
Washita Slips, Extra.....80¢
Washita Slips, No. 1.....70¢
Washita Slips, No. 2.....40¢
India Oil Stones (entire list)...33⅓%
Quickcut Emery and Corundum Oil Stone, Double Grit.....40%
Quickcut Emery and Corundum Axe Stone, Double Grit.....33⅓%
Quickcut Emery Rubbing Bricks..40%
Hindostan No. 1, R'g'lar. ℔ lb 8¢
Hindostan No. 1, Small..℔ lb 10¢
Turkey Oil Stones, Extra, 5 to 8 in.....℔ lb 80¢
Queer Creek Stones, 4 to 8 in.20¢
Queer Creek Slips.....40¢
Sand Stone..... 6¢

Scythe Stones—

Pike Mfg. Co., 1907 list:
Black Diamond S. S..℔ gro. $12.00
Lamoille S. S.....℔ gro. $11.00
White Mountain S. S.℔ gro. $9.50
Green Mountain S. S.℔ gro. $7.00
Extra Indian Pond S.S.℔ gro. $8.00
No. 1 Indian Pond S.S.℔ gro. $7.50
No. 2 Indian Pond S.S.℔ gro. $5.00
Leader Red End S. S.℔ gro. $5.00
Quick Cut Emery....℔ gro. $10.00
Pure Corundum.....℔ gro. $18.00
Crescent $7.00
Emery Scythe Rifles, 2 Coat. $8.80
Emery Scythe Rifles, 3 Coat.$11.00
Emery Scythe Rifles, 4 Coat.$13.20
Balance of 1907 list 33⅓%
Lectro (Artificial), ℔ gro., $12.00 33⅓%
$12.00 .....33⅓%
Lightning (Artificial), ℔ gro., $18.00 .....33⅓%

Stoppers, Bottle—

Victor Bottle Stoppers.....℔ gro. $9.00

Stops— Bench—

Millers Falls.....15&10%
Morrill's, ℔ doz., No. 1, $10.00....50%
Morrill's, No. 2, $12.50.....50%
Seymour Smith & Son's.....60%

Door—

Chapin-Stephens Co.....50@50&10%

Plane—

Chapin-Stevens Co.....20%

Straps— Box—

Acme Embossed, case lots..20&10&10%
Cary's Universal, case lots...20&10&10%

Stroppers, Razor—

Pullman Safety Razor Blade, doz.$8.50

Stuffers, Sausage—

Enterprise Mfg. Co., Stuffers and Lard Presses.....25@25&7½%
P. S. & W. Co.....40&10&5%

Swings, Lawn—

Myers' Low Down Roller.....$6.25

Tacks, Finishing Nails, &c.

American Carpet Tacks.90&25@—%
American Cut Tacks..90&25@—%
Swedes' Cut Tacks.L..90&30@—%
Swedes' Upholsterers'.90&35@—%
Gimp Tacks.....90&35@—%
Lace Tacks.....90&35@—%
Trimmers' Tacks.....90&30@—%
Looking Glass Tacks.....65@—%
Bill Posters' and Railroad Tacks, 90&10@—%
Hungarian Nails.....80@—%
Finishing Nails.....70@—%
Trunk and Clout Nails.75&5@—%
NOTE.—The above prices are for Straight Weights
See also Nails, Wire.

Double Pointed—

Double Pointed Tacks, 90&4tens@90&5tens%

Tapes, Measuring—

American Asses' Skin....50@—%
Patent Leather.....25@30&5%
Steel .....33⅓&5%
Chesterman's .....25@25&5%
Keuffel & Esser Co.:
Favorite, Ass Skin.....40&10@50%
Favorite, Duck and Leather..... 25&5@25&10%
Metallic and Steel, lower list, 35@35&5%; Pocket, 35@35&5%.

Lufkins:
Asses' Skin.....40&10@50%
Metallic .....33@30&5%
Patent Bend, Leather...25&5@25&10%
Pocket .....40@40&5%
Steel .....33⅓@33⅓%
Wiebusch & Hilger:
Chesterman's Metallic, No. 34L, etc. 25%
Chesterman's Steel, No. 1038L, etc. 33%

Teeth, Harrow—

Steel Harrow Teeth, plain or headed, ¾-inch and larger per 100 lb.....$2.55@$2.80

Thermometers—

Tin Case, Cabinet, Flange, Dairy, &c.....30@35%

Ties, Bale—Steel Wire—

Single Loop.....32½&10%
Monitor, Cross Head, &c.70&2½%

Tinware—

Stamped, Japanned and Pieced, sold very generally at net prices.

Tops, Chimney—

Iwan Volcano Chimney Tops.....55%

Tools—Coopers'—

L. & I. J. White.....20@20&5%

Ice Tools—

Gifford-Wood Co.....15%

Saw—

Atkins' Cross Cut Saw Tools.....35%
Simond's Improved.....33⅓%
Simonds' Crescent.....30%

Ship—

L. & I. J. White.....25%

Torches—

Hammers, Engine, ℔ doz.....$1.50

Traps—Fly—

Balloon, Globe or Acme, doz., $1.15@$1.25; gro....$11.50@12.00
Harper, Champion or Paragon, doz., $1.25@1.40; gro.$13.00@13.50

Game—

Imitation Oneida.....75@10%
Newhouse .....50&5%
Hawley & Norton.....65&10%
Victor .....75@75&10%
Oneida Community Jump.....70&5%
Stop Thief.....60%
Tree Trap.....60%
Hector .....75@75&5%

Mouse and Rat—

Mouse, Wood, Choker, doz. holes, 12¢
Mouse, Round or Square Wire, doz. 85@90¢

Trowels—

Disston Brick and Pointing.....25%
Disston Plastering.....20%
Disston "Standard Brand" and Garden Trowels.....30%
Kohler's Steel Garden Trowels, ℔ gro., 5 in., $4.80; 6 in., $6.00.
Never-Break Forged Steel Garden Trowels in 1 doz. boxes, ℔ gro. $6.50
Wm. Rose & Bros., Bricklayers' and Plasterers'.....25&5%
Woodrough & McParlin, Plastering.25%

Trucks, Warehouse, &c.—

McKinney Trucks.....each, net $10.00

Tubs, Wash—

Net, per gross.

	No. 0	1	2	3
Galvanized...	*$29.00*	*$8.00*	*55.00*	*62.00*

Twine, Miscellaneous—

Flax Twine:
No. 9, ¼ and ½-lb. Balls.21@23¢
No. 12, ¼ and ½-lb. Balls.19@21¢
No. 18, ¼ and ½-lb. Balls.16@18¢
No. 24, ¼ and ½ -lb. Balls. 15½@17½¢
No. 36, ¼ and ½-lb. Balls.15@17¢
Cotton Mops, 6, 9, 12 and 15 lb. to doz.....8½@21¢
Cotton Wrapping, 5 Balls to lb., according to quality....12@23¢
American 2-Ply Hemp, ¼ and ½-lb. Balls.....12½@18¢
American 3-Ply Hemp, 1-lb Balls .....13½@16¢
India, 2-Ply Hemp, 1½-lb. Balls, Balls (Spring Twine)...7½@9¢
India 3-Ply Hemp, 1-lb. Balls 7½@9¢
India 2-Ply Hemp, 1½-lb. Balls, 7@8½¢
2, 3, 4 and 5-Ply Jute, 1½-lb. Balls .....9@11¢
No. 264 Mattress, ¼ and ½ lb. Balls, according to quality. 30@60¢
Wool, 3 to 6 ply....B 6¢; A 7½¢

Vises—

Solid Box.....60@60&5%

Parallel—

Fisher & Norris Double Screw Leg, each, Nos. 2, $10.50; 3, $16.00; 4, $20.50; 5, $27.00; 6, $32.00.....20%
Fisher-Brooks Bench and Woodworkers' Vises, No. 0, $3.80; No. 1, $5.90; No. 2, $8.25; No. 3, $10.50; No. 4, $13.50.....40%
Merrill's 25%
Millers Falls Oval Slide Pattern.60&10%
Parker's:
Victor, 20@25%; Regulars....20@25%
Vulcan's .....40@45%
Combination Pipe.....55@60%
Prentiss Vise Co.:
Patent, Bicycle, Shepard, Gipsy, Adj. Column, Lewis Adj. Jaw..25%
Rapid Transit, Heavy Chipping..30%
Bull Dog, Anchor Line, Yankee Quick Lever, Lewis Solid Jaw Eclipse Wrench Attachment...40%
Monarch 45%
Vise Jaw Caps 10%
Pullman Automatic Bench, ℔ doz., No. 1, $7.50; No. 2.....$9.50

Pipe—

Curtis & Curtis Malleable.....25%
Parker's Combination:
87 Series, 60%; 187 Series, 60&5%; No. 870, 40%.
Prentiss Vise Co.:
Blake Combination, Prentiss Combination, Prentiss.....60%
Malleable; Monarch Combination 65%
Rex Combination.....70%
Peerless Pipe Grip.....25%

Saw Filers

Disston's D 3 Clamp and Guide, ℔ doz., $24.00, 30%; Clamps.....30%
Reading .....50&10%

Wood Workers—

Prentiss Cabinet Makers'.....40%
Wyman & Gordon's Quick Action, 6 in., $6.00; 9 in., $7.00; 14 in., $8.00.

Wads— *Price per M.*

B. E., 11 up..... 60¢
B. E., 9 and 10..... 70¢
B. E., 8..... 80¢
B. E., 7..... 80¢
P. E., 11 up.....$1.00
P. E., 9 and 10..... 1.25
P. E., 8..... 1.50
P. E., 7..... 1.50
Ely's B. E., 11 and larger.$1.70@1.75
Ely's P. E., 12 to 20....$3.00@3.25

Dis. 15%

Ware, Hollow—Cast Iron, Hollow—

Store Hollow Ware:
Enameled .....45&10%
Ground .....50&5%
Plain or Unground.....60%
Country Hollow Ware, per 100 lbs .....$2.75@$3.00
White Enameled Ware:
Maslin Kettles.....65&10%
Covered Wares:
Tinned and Turned.....35&10%
Enameled .....65&10%
See also *Pots, Glue.*

Enameled—

Agate Nickel Steel Ware.....33⅓%
El-an-ge .....60&10%
Iron Clad Ware.....70&10%
Lava and Volcanic, Enameled..40&10%

Tea Kettles—

Galvanized Tea Kettles:

Inch	6	7	8	9
Each	*45¢*	*50¢*	*55¢*	*65¢*

Steel Hollow Ware—

Avery Stamping Co.:
Never-Break Spiders and Griddles .....65&10%
Steel Kettles, Maslins Scotch Bowls, Tin'd.....60%
Steel Stew Pans, Stew Pots, etc., Porcelained 50%
Cleveland Stamping & Tool Co.:
Solid Steel Spiders and Griddles .....65&5%
Solid Steel Kettles.....60&5%

Warmers, Foot—

Pike Mfg. Co., Soapstone....40@40&10%

Washboards—

No.	℔ doz.
800—Brass King, Single Surface, Open Back	$3.00
801—Brass King, Single Surface, Open Back	$2.50
802—Brass Junior, Single Surface, Open Back	$2.25
862—White Hen, Spiral Crimp Glass	$3.15
964—Royal Blue Enamel, Single Surface, Ventilated Back	$3.25
172—Our Best, Single Zinc, Soap Drainer	$3.25
722—Soap Saver, Single Zinc, Iron Top	$3.35
100—Northern Queen, Single Zinc, Perforated, Open Back	$3.00
134—Universal, Single Zinc, Extra Family Size Ventilated Back	$2.80
710—Regal, Single Zinc, Extra Family Size, Ventilated Back	$2.50
760—Banner Globe, Single Zinc, Ventilated Back	$2.25
57—Peerless, Double Zinc, Spring Protector	$3.70
56—Red Cross, Double Zinc, Swing Protector	$3.60
17—North Star, Solid Zinc, Swing Protector	$3.60
797—Jewel, Single Zinc, Pail Size	$1.25

Washers—Leather, Axle—

Solid .....90@90&10%
Patent .....90@90&5%

Coil:	*¾*	*1*	*1⅛*	*1¼ inch.*
	9¢	*10¢*	*11¢*	*14¢ per box.*

Iron or Steel—

Size bolt....	*5-16*	*⅜*	*½*	*⅝*	*¾*
Washers....	*$4.90*	*4.00*	*2.70*	*2.50*	*2.30*

The above prices are based on $6.50 off list.
In lots less than one keg add ½¢ per lb.; 5-lb. boxes add ½¢ to list.
Avery Stamping Co.:
Standard, in 200 lb kegs, $6.00 ℔ 100 lb. disct.; in 100 lb kegs add 10¢ net ℔ 100 lb; in 5 or 10 lb boxes, add 50¢ net ℔ 100 lb; in 1 lb boxes, add $1.00 net ℔ 100 lb.

Cast Washers—

Over ½-inch, barrel lots, per lb. 1½@1¾¢

Wedges—

Oil Finish.....lb., 2¼@2¾¢

Weights—Hitching—

Covert Mfg. Co.....25%

Sash—

Eastern market.....$25.00@$26.00
Middle West.....$24.00@$26.00

Wheels, Corundum and Emery—

Pike Mfg. Co., Corundum, 65%; Emery 75%

Well—

8-in., $2.00; 10-in., $2.30; 12-in., $3.00; 14-in., $4.45.

Wire and Wire Goods—

Market and Stone Wire in Bundles—

Bright and Annealed:
9 and coarser.....80%
10 to 18.....80&10%
19 to 26.....80&10&2½%
27 to 36.....80&5%
Galvanized:
9 and coarser.....75&10%
10 to 16.....75&10%
17 to 26.....72½&10%
27 to 36.....72½%
Coppered:
9 and coarser.....75&10%
10 to 26.....75&10%
27 to 36.....70&10&5%
Tinned:
6 to 18.....75&10&10%
Brass.....15¾¢ lb., base
Copper .....14½¢ lb., base
Cast Steel Wire.....50%

Spooled Wire—

Annealed and Tinned, 70&10&10&10%
Brass and Copper...60&10&10&10%
Retailers' Assortments, per box, $1.90@$2.10

Bright Wire Goods—

Steel Wire Goods, 90&20@90&20&10%
Brass Wire Goods, 90&20@90&20&10%
Brass Cup and Shoulder Hooks, —85%

Wire Cloth and Netting—

Galvanized Poultry Netting, 80&10&5@80&10&10%
Screen Cloth, 12 Mesh, Per 100 sq. ft.; Painted, $1.35; Galvanized, $1.95; 14 Mesh, Bronze $6.50.
Standard Galv. Hardware Grade: 100 ft. rolls, 2½ to 48 in. wide, Per 100 sq. ft.
Nos. 2, 2½ and 3 Mesh....$2.50
Nos. 4 and 5 Mesh.....$2.75
No. 6 Mesh.....$3.00
Nos. 7 and 8 Mesh.....$3.50

Wire, Barb—See *Trade Report*

Wrenches—

Agricultural .....75&10@80&5%
Alligator or Crocodile.70&10@75%
Baxter Pattern S Wrenches, 70&5@70&10%
Drop Forged S.....45@45&5%
Acme .....60&10%
Alligator Pattern, 70%; Bull Dog..70%
Bemis & Call's:
Adjustable S, 40&5%; Adjustable S Pipe, 40&5%; Briggs Pattern, 40%; Combination Bright, 50%.
Steel Handle Nut.....50&5%
Combination Black.....50&5%
Merrick Pattern.....50&5%
Coes' Genuine Knife Hdl...40&10% &
Coes' Genuine Steel Hdl...40&10&5&5%
Coes' Genuine Key Model..40&10&5&5%
Coes' Genuine Hammer Handle..... 40&10&5&5%
Coes' "Mechanics'"...40&10&10&5&5%
Hercules 70%
W. & B. Machiaist:
Case lots.....50&10%
Less than case lots.....50%
W. & B. Railroad Special:
Case lots.....50%
Less than case lots.....40&10&5%
Solid Handles, P., S. & W..50&10%; full cases.....50&10&5%
Vulcan and Agrippa Chain.....50%
Wizard Adjustable Ratchet.....50%

Can and Jar—

Bent, P. Forbes Triumph, doz., $0.75; Triumph Syrup Cap, gro. $4.00

Wrought Goods—

Staple Hooks, &c., list March 11, '02.....90@—%

Zinc—

(Cask lots, 600 lb., at mill.)
Sheet.....per 100 lb., $8.00